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South African Nights

The only type of South African nights we can legitimately deal with are those organized by the South African branch of the Institute of British Foundrymen. These are conducted on lines very similar to those held in this country, but there is a spice about "Problem Evenings" which is peculiarly their own. This is due no doubt to the fact that members take part well knowing that their audience is representative of the whole of the South African foundry industry, except the coastal regions. Here, at branch meetings, Sheffield speaks only to Sheffield and Newcastle to Newcastle and so forth, and one is left in doubt as to what Birmingham or Scotland may think, as conditions vary so much from place to place.

The last South African branch meeting of which a report is available to us, was held under the chairmanship of Mr. Bullock, vice-president, and was devoted to shortages and the problems they cause. First of all, pattern timber came under consideration. The two best-liked, clear pine and Honduras mahogany, are both difficult to obtain. The local timbers, which had to be used during the war, were not too satisfactory, so trials have been made with pressed woods now obtainable in hard and soft varieties. The hard type, had a tendency to warp and, as was the case with the other timber, a native pine, was hard on the cutting edges of chisels, gouges, and the like. Plaster compounds, especially the better types were in short supply and when available were very expensive. A sheave wheel pattern was shown made from a pattern-stone material which was still good after making 60 castings. Next, the pig-iron shortage came into the limelight. It seems that, since the recent increase in price, there has been some unloading of black-market scrap, but there are still reserves held for those who are prepared to pay high prices. Steel scrap and ferro-additions are being used on an increasing scale, as is briquetted swarf of 75 per cent. true density of steel or cast iron. A limit of 15 per cent. was placed upon use of this swarf as a constituent of the charge. A fruitful source of economy was to sweep-up the fines from the wagons bringing pig-iron to the works. The average collectable amount was of the order of 700 lb.! It should be realized, however, that the South Africans use 42-ton capacity wagons. These tailings are bonded with 10 per cent. of cement by weight or used in canisters. The scrap collection has extended to surfaces of the stockyards, where it has been found that the top layer carried 11 per cent. of metallic iron recoverable by magnetic treatment. The audience was then given a short homily on the better-known, but oft-neglected aspects of metal economy.

It is clear that African technical nights are much the same as European. There is the same helpful exchange of experiences, the same wandering from the subject if extraneous matters be of equal interest and, we expect, the same post-lecture conversations at which still more information is abstracted. Finally, from what we have written, obviously there are exactly the same worries besetting the South African foundry industry as here at home.

Colouring and Marking of Wooden Pattern Equipment

The British Standards Institution has issued B.S. 467: 1952 and B.S. 467c : 1952, which set out a scheme for colouring wooden patterns and coreboxes. In the new specification there are major changes reconciling the objections which mitigated against universal application of the earlier standard. For instance, the metal of the casting is no longer to be denoted by the colour of the pattern, but the information as to metal is to be added as a legend if required. Black as a base colour has commendably been discarded, though retained for marking particular locations on a pattern. This optional addition of a painted-on inscription applies also to such things as chills, " touch " points, contraction allowances, number of cores per casting (on coreboxes), and such special requirements as " hydraulic test." For cheaper patternwork, only spotting or striping of coreprints and the like with the recommended colours is stipulated, over a coat of shellac varnish on the natural wood.

It will be noted that there are two specifications; the former, which costs 2s. post free, carries the full text and a coloured diagram. The latter, having the same number but with the addition of the letter C, is really a coloured wall-chart and gives all the essentials. This costs 1s. (post free). The reviewer sincerely hopes that these specifications will be bought and applied by every foundry and patternshop throughout the country. The address from which they are obtainable is 24, Victoria Street, London, S.W.1.

More Long-service Awards

A further large batch of long-service awards to foundrymen was made at a dinner held in the works canteen of Harrison & Company (Lincoln) on February 2, when 127 employees with 21 or more years' unbroken service, were presented with clocks and watches by the managing director, Mr. Francis D. Ley. Those with 40 or more years' service received, in addition to a clock or watch, a gift of £10. These 127 employees represent a total service of 4,440 years; 42 of them have completed 40 or more years and five have over 50 years' service.

Before making these presentations, Mr. Ley was himself presented with a silver cigarette box from the management, staff and employees in recognition of his own 21 years' service, which he completed last year. This presentation was made by the general manager, Mr. G. R. Wildsmith.

Future Prospects for Metals

Within 15 years, the solution to many of our metal problems will be titanium, which is uncorrodible, prophesied Mr. F. V. Everard, a director of Belliss & Morcom, Limited, when he addressed the Birmingham Junior Chamber of Commerce on February 5. It is the metal of the future, he added. Another forecast which Mr. Everard made was of a coming nickel " squeeze " which will affect many domestic appliances such as electric fires. He also gave a review of the new approach to jet-engine design, referring to it as the " design for mission " principle. By it, jets could be built without using any scarce metals, although ten times the manufacturing capacity would be necessary to build the additional engines, since the average life of the jet engine would be shorter and replacements would be more frequently required.

Forty Years Ago

The February issue of the FOUNDRY TRADE JOURNAL of 1912 contains an abstract of a paper read in Berlin on " Up-to-date Appliances for the Removal of Dust, Ventilating and Atmospheric Heating in Foundry work " by Herr Danneborg. We like the phrase " the only rational way is to draw the smoke [dust ?] away direct from the point of origin." A note on core inspection might very well have been written to-day. A paper on " Modern Foundry Appliances " by Mr. Green contains the phrase " Many a good [moulding] machine has been condemned and scrapped through no fault of the machine itself but through the equipment provided for it." There is a sketchy description of the snap-flask method of moulding, said to be invented by Leeder, foundry manager, Singer Company, Kilbowie " many years ago." There is an extraordinary picture of Fraser and Chalmers' foundry; it appears to be staffed by a football crowd. Amongst new companies registered was Barford & Perkins of Peterborough.

Commercial Services in Glasgow

In response to many requests received for office facilities, the (Scottish) Engineering Centre has now arranged accommodation for a limited number of engineering firms' agents or representatives. An area of approximately 1,000 sq. ft. is being furnished with tables, desks, private lockers and telephone booths. The total number of participants will be limited to about 20. The facilities offered include the use of the Centre's telephone numbers and address for the receipt of mail, messages, etc. Letter typing can be undertaken either from copy or by dictation, and the Centre's catalogue library and information service may be used.

The weekly charge made will be found to compare very favourably with the normal charges for accommodation and secretarial services and it is thought that the availability may be of interest to firms who are contemplating the appointment of a Scottish representative.

Foundry Baths at Falkirk

Employees of the Scottish Central Iron Company, Limited, Falkirk, are now in the happy position of being able to have a bath before leaving the foundry for home. Last week the Company's new baths were officially opened. There are hot and cold spray baths, drying-rooms and cloak-rooms. There are also other washing facilities in the new layout.

The social and domestic benefits of the new baths are obvious: an employee, say a moulder, who previously had to undergo something approaching a thorough bath at home, in many cases in a small kitchen, can now arrive home clean. Employees, who have watched the progress of the new baths with interest, are gratified at this latest addition for their welfare.

Index to Vol. 91

The index to Vol. 91 of the FOUNDRY TRADE JOURNAL covering the period from July to December, 1951, has now been published, and copies may be obtained free of charge on application to the publishing office of the JOURNAL at 49, Wellington Street, London, W.C.2. Regular subscribers who wish to obtain copies of indices automatically when published are invited to apply for inclusion on a permanent list.

Ferranti Foundry

Innovations in Mechanized Production

By V. C. Faulkner

(*Continued from page* 144)

Knock-out

On arrival at the knock-out, a pneumatic thrust operated by one man transfers the boxes to the Sterling vibrating grid. A second man places the empty boxes on to a power humper, which automatically transfers them to an inclined roller track for return by gravity to the moulding machines. The castings are placed on trays forming part of a pendulum conveyor having a 460-ft. circuit length, which can be seen in Fig. 12. The runners and scrap are placed on the same conveyor in special containers of Ferranti design, which on reaching the scrap bins encounter a trip mechanism, causing them to empty and then automatically close and lock themselves in the normal position. This arrangement is shown in Fig. 13.

Fettling

The shot-blasting of castings is done on a Spenstead airless rotary table-type machine on which are fitted six, circular, auxiliary tables, rotating in turn on their own axes. When the pendulum conveyor reaches the shot-blast plant, castings are, according to size, either placed directly on these circular tables or if small, on circular wire-mesh trays. By the means of these trays which just fit the auxiliary rotating tables, much handling time is saved, and the machine capacity is utilized to its maximum. After shot-blasting, castings are placed on a 96-ft. long, rubber belt conveyor, which differs from most in that the surface carries three parallel ribs running lengthwise. These facilitate picking up the castings for the first inspection, which is done at this stage. The castings are ground on four double-ended Luke & Spencer high-speed grinders, and then on the same conveyor pass to the fettling section, second inspection, weighing and gauging and finally to despatch. An item of unusual interest along the fettling line is a fly-press fitted with special tools for the removal of flash from the "windows" of certain types of castings. There is considerable saving in time and this idea is being developed for other types of castings and it is intended to instal more fly-presses. Handling of the finished product in the despatch department is greatly facilitated by the general foundry floor level being higher than that of the loading dock, so that goods may be trucked direct on to the lorry flats. During loading, lorries stand on a 20-ton weighbridge, so that check weighings on all outgoing castings may be made.

FIG. 12.—*Knock-out with Pneumatic Push-off. Overhead Chain Conveyor with Pendulum Trays for Castings and Special Containers for Scrap is shown Top Right.*

Coremaking

Core production can be regarded from two angles, light and medium cores which is mechanized and concentrated in one shop, and "heavy" cores which are produced beneath the crane track in the jobbing bay. Oil-sand mixtures are prepared in a separate shop, where both Rotoil and paddle-type mixers are in use. Small cores are made

Ferranti Foundry

in one section by girls, who are provided with a specially adjustable core bench (see Fig. 14) and stools to sit on whilst working. Where only small quantities are required, cores are hand-rammed in wooden or metal boxes. Specially-adapted Pridmore moulding machines are used for certain standardized types of core, but more and more are now being blown on Osborn and Redford core-blowers. Centrally placed in the shop between the girls' core-benches is a wooden-slat conveyor which carries the cores first to a spray booth for blacking when necessary, and thence to two gas-fired Acme continuous stoves. After baking, the cores are loaded on transportable shelved stands for transference to the moulding stations. Heavier cores made on specially adapted Osborn and Herman moulding machines are also dried on the Acme stoves, but the largest cores, frequently up to three tons in weight, are handled by overhead crane and dried in a 20 ft. by 13½ ft. by 10 ft. high batch stove of Pneulec make which is fired by mechanical stoker. All stoves are fitted with recording-type thermometers, and temperature records are identified with the results obtained in the castings.

Jobbing (Sandslinger) Bay

The Sandslinger is of the motive type and a picture of it is given in Fig. 15. Generally speaking, it takes care of the ramming of the heavier type of moulds. At the time of the Author's visit, amongst other jobs, the mould for a 5-ton casting was being cast in Nomag. The appearance of this alloy when liquid is quite different from ordinary grey iron, as it has a distinctive colour and seems to the uninitiated to be sluggish, yet shows no signs of the imperfections usually to be associated with cold metal. This bay is served by two overhead electric cranes, the larger being of 10 tons capacity, and apart from a few moulds which, because of their exceptional size and depth are still bedded into the floor, the remaining boxes are handled by crane, for knock-out into the sand-reconditioning plant previously mentioned.

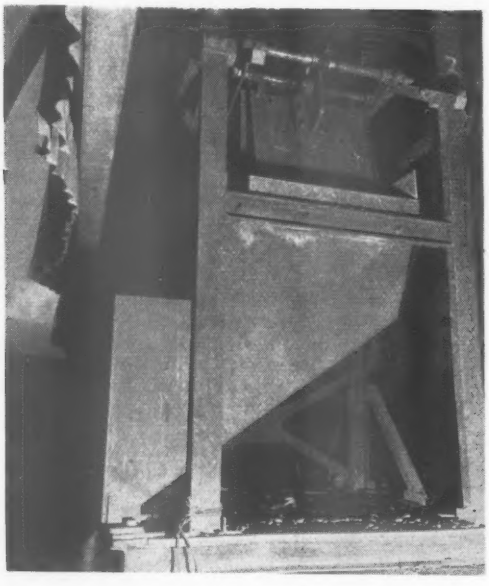


FIG. 13.—*Trip Mechanism for Automatic Delivery of Scrap from the Special Container into Bins.*

Machine-moulding Plant

In the contiguous bay, there are a pair of Pneulec Herman jolt-rollover machines, fed by the fourth automatic sand-plant previously mentioned. Whilst the moulds made in this section were once all dried, good progress has been made in casting-up in the green state, and nearly all are now produced this way. Empty moulding boxes are handled on to the machines by electric jib-crane and the completed moulds are cored up, closed and cast by overhead crane. Batch casting twice a day is employed and boxes are knocked-out in a Sterling shake-out. The next step projected toward the complete mechanization of this section is the installation of gravity-roller conveyors, when it is hoped that continuous casting can be instituted here too. The mould-drying stove installed in this section is solid-fuel fired by mechanical stoker, and is outstanding in respect of its instrumentation. By the use of these instruments a predetermined cycle for heating can be arranged, or the stove can be made to start or stop functioning just by the setting of the instruments. The elimination of human supervision during night shifts must show worthwhile economies

Lighting, Heating and Ventilating

The foundry buildings have been designed with a very considerable area of glass both overhead and on the side walls. In consequence, there is a very high standard of natural lighting and far more than one is accustomed to encounter in the average run of foundries. This is augmented by a mixed system of mercury-vapour and tungsten-filament lighting, giving an overall intensity of 15-ft. candles, which is augmented by localized lighting at the working plane wherever necessary. All hand-inspection lamps in this foundry operate at 25 volts—an important precautionary measure. The knock-outs and sand-plants are well ventilated, and a very good standard of heating by battery-type heaters is achieved. The management are, however, by no means satisfied and intend to take the ventilation of this foundry very much further.

Amenities

Amenities have always been of a very high standard at Hollinwood, but when the foundry was reorganized, the washing and bathing facilities together with the canteen and administrative offices were housed in a quite separate but adjacent building. In entering this building from the works, all must pass over a sharp grating covering a pit on the way in. This most effectively removes the

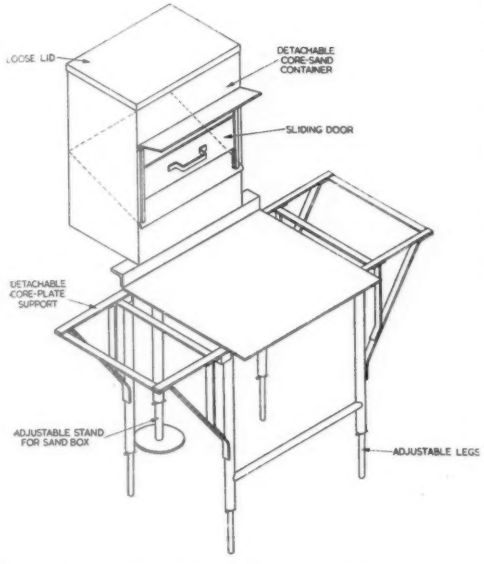


FIG. 14.—*Sketch of Adjustable Core Bench, and Core-sand Container Adjacent.*

surprising amount of sand which can adhere to one's shoes in a foundry. Once inside, one finds that every employee is provided with a separate locker, of which he or she retains the key, but, in addition, lines of coat hooks are provided to take care of wet overcoats and beneath these there is a current of warm air. This is probably better even than passing a current of air through the actual lockers. In the wash-rooms, individual wash-basins are installed, as British working men, despite the small majority of the Government, are inherently conservative, and prefer the traditional wash-basins to the communal circular types. A considerable number of foot-baths and showers are also provided, privacy in the use of the latter being ensured by each cubicle having its own small dressing-room attached. These bathing facilities are used by 76 per cent. of the employees. Those on the dirtiest jobs, such as knocking-out, bathe every day. Some bathe two or three times a week. The balance avail themselves of the facilities regularly once a week. An analysis shows there is equal usage by young and old, by those living nearby and those coming to work from a distance.

FIG. 15.—*Motive-type Sandslinger for Ramming the Heavier Type of Moulds.*

It is interesting to note that the popularity of these amenities is continuously increasing.

The same building, in addition to housing the administrative offices, also contains staff and works canteens for the foundry employees. These are characterized by an extremely light and airy appearance and have proved very popular with the workers. Ferranti, Limited, being a very large concern, have a number of canteens, and food comes in containers from a central kitchen, with the exception of chipped potatoes. This is, of course, a very popular Lancashire dish, and, as experience shows that chips are one of the few items which cannot satisfactorily be carried, all chips are prepared on the premises. Fig. 16 shows the general layout of this building, and it will be noticed that it also houses the ambulance room. While visiting various works from time to time the Author has inspected many ambulance rooms, and in this case the company have undoubtedly gone to considerable trouble to ensure that every facility should be provided and that only the best equipment should be used.

Sporting activities have received the generous attention of the management and there are provided excellent tennis courts, bowling greens, and football and cricket pitches. A very fine clubhouse (fully licensed) supplies facilities for socials, dances, billiards and general indoor activities.

Patterns

The manufacture of large quantities of accurate repetition castings has led the company to adopt a very specialized technique in metal-pattern manufacture. There is no doubt that this has been influenced to a considerable extent by their experience with press tools and Bakelite mouldings. Suffice it to say that the foundry has a large and very busy tool-room where metal patterns are produced, machined all over and finished to a very high degree of accuracy. Adjacent to the main buildings—but separated because of the fire risk—is

a wood-pattern store and patternshop. Here all non-standard patterns—which in some cases may be of considerable size—and also all prototypes and models, " mock-ups," etc., are prepared.

As may be expected with an electrical engineering firm of the standing of Ferranti, Limited, considerable use has been made of electricity in this modern and highly-mechanized foundry. It is interesting to note that the foundry has its own high-tension substation and distribution equipment, with a maximum load—apart from load-shedding—of 430 kilowatts, and that the total horse-power of the motors employed is 833.

Appendix I gives details of the motors used on the various plant.

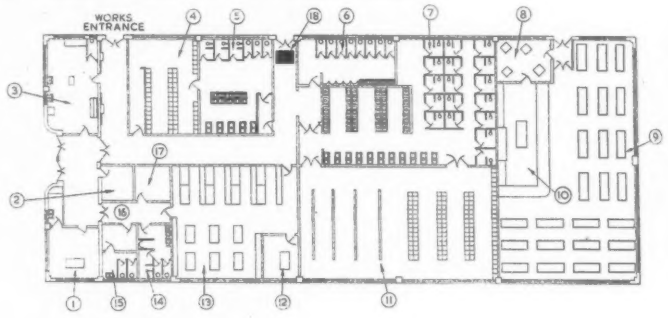
Conclusion

The Ferranti foundry is probably unique in that it manufactures two specialities—Nomag, a high-nickel, non-magnetic alloy, in large quantities and a wide weight range of very light-section virtually precision castings for the electrical and allied industries. However, these two lines by no means embrace the whole of this foundry's activities and very varied types of castings are made for the general engineering, automobile, agricultural, textile and other similar industries.

The writer very sincerely thanks Mr. R. Laroux Handley, departmental manager, and his staff for the help given in the preparation of this article.

FIG. 16.—*Plan of Amenities Building at the Ferranti Foundry.*

1—Departmental Manager's Office.
2—Receptionist and Telephone Exchange.
3—Ambulance Room.
4—Females' Locker Room (56 lockers).
5—Females' Toilet.
6—Males' Toilet.
7—Males' Ablution (30 hand-basins, 17 showers, etc.).
8—Staff Dining Room.
9—Works Dining Room.
10—Kitchen and Serving Counter.
11—Males' Locker Room (113 lockers, etc.).
12—Sales Manager's Office.
13—General Office.
14—Male Staff Toilet.
15—Female Staff Toilet.
16—Female Staff Cloakroom.
17—Male Staff Cloakroom.
18—Dirt Collecting Grids in Floor.



APPENDIX I

Electric Motors in the Ferranti Foundry Department

Continuous Casting Plants Nos. 1 and 2.

	Total h.p.		Total h.p.
Hopper belt (2)	12	Red-sand belt (2)	4
Disintegrator (4)	24	Knock-out belt (2)	6
Sandmill elevator (2)	8	Conveyor to used-sand elevator (2)	4
Box conveyor (2)	2	Vibrator on disintegrator (2)	½
Sand-mill feed (2)	8	Vibrators, 40-ton hopper (4)	1
Sand-mill (2)	60	Mould conveyor (2)	10
Magnetic separator (2)	1½	Knock-out (2)	6
Rotary screen (2)	4	Pendulum conveyor (2)	4
Used-sand elevator (2)	8		
Dust-removal fan (2)	15		
Coal-dust belt (2)	2		
Spiller belt (2)	10		

Shot-blast Machine.

Elevator	2	Impellor (2)	25
Bottom table	2	Dust extractor	7½
Top table	2		

Brass-moulding Shop.

Band saw	2	Exhaust fan	7½
Oil-fired furnace	5		

Tool-room.

Milling machine	2	Small hand drill	¼
Small lathe	½	Linisher	1½
Tauco drill	¼	Bench grinder	1
Electriska drill	½	Large lathe	1½
Keller grinder	½	Radial drill	1
Large hand drill	½		

Sandslinger.

Impellor drive	16	Conveyor-belt drives, third	1
Conveyor-belt drives, first	1	Bucket elevator and vibrating screen	2½
Conveyor-belt drives, second	1		

Sandslinger Sand-plant.

Sand-mill	10	hoppers (2)	15
Sand-mill feeder	5	Feeder belt to 'slinger	7½
Rotary screen	3	Elevator to rotary screen	4
Elevator from sand-mill to hopper belt	3	Belt from knock-out to elevator	3
Hopper belt	3	Magnetic separator	
Rotary tables from		Knock-out	15½

Sand-plant for Herman Machines.

Conveyor belt to Herman machine hoppers	1½	Rotary screen	2
Auto-stoker	1	Belt conveyor	2
Stoker fan	3	Elevator to twin hopper	2
Magnetic separator	¾	Elevator from sand-mill	2
Dust-exhaust fan	10	Sand-mill	10
Knock-out elevator	2	Knock-out	15
		Rotary table	2

Compressor House.

100-lb. compressor	66	100-lb. B. & W. compressor	90
40-lb. compressor	35		
Water pump	2½	100-lb. compressor (small B. & W.)	20

Coreshop.

Vertical core stove No. 1	1½	Spermolin sand mixer	5
Vertical core stove No. 2	1½	Rotoll sand mixer	4½
Core conveyor	1	Auto-stoker	1

Cranes.

10-ton cross traverse	2	Hoisting	6
10-ton long traverse	7	Jib crane (Herman)	3
10-ton hoisting	15	Outside crane hoist	12
3-ton A.C. cross traverse	2	Outside crane cross traverse	2½
3-ton A.C. long traverse	5		
Hoisting	10	Outside crane long traverse	14
3-ton D.C. cross traverse	1		
3-ton D.C. long traverse	6·4		

Grinders and Dust-extractors.

Swing-frame grinder	5	L. & S. grinder (3)	22½
Grinding machine	1	Dust exhaust (3)	9

Grinders and Miscellaneous.

Polisher	3	Mould-drier	1
Dust exhaust	½	Pig-breaker	5
Rover	1	Bench drill	1½
Jackman sand mill	7½	Casting conveyor	1½

Furnaces.

Motorised fan, large cupola	12	A.C. motorized fan	12
D.C. motorized fan	10	Furnace blower (3)	15

Heating Units and Miscellaneous.

Large (22)	11	Hardness-testing machine	¼
Small (6)	0.432	Roof ventilation fans (7)	4.2
Fan motor for laboratory	1		
		Grand Total	833

Publications Received

1951 Illustrated. Published by Dorman, Long & Company, Limited, Middlesbrough.

This is one of a series of booklets issued in recent years with the object of portraying the activities of this great industrial enterprise in a manner readily appreciated by its employees. The foreword by Mr. Ellis Hunter contains no whine as to the filching of raw materials by the foundry industry, but proudly reports a record output in 1951. In 16 well-illustrated pages the story of the real difficulties of the past year is told, with pictures of a number of their staff who have made a worthwhile contribution.

B.S.F.A. Bulletin, Vol. 2, No. 3. Issued by the British Steel Founders' Association, Broomgrove Lodge, Broomgrove Road, Sheffield, 10.

This issue is entitled "Buying Steel Castings," and rightly, there has been included a summary of the requirements set out in British Standard and A.S.T.M. Specifications. Only general principals are given, as, it is stressed, anything out of the ordinary demands the closest collaboration from the very start. The final precept, to place orders with concerns experienced in the production of similar lines of castings is worthwhile. What is easy for one foundry is just the cause of a series of headaches to another. This very readable pamphlet is available to interested parties on writing to Sheffield.

Hackley Manual Training School Foundry Section. Public School System, City of Muskegon, Michigan, U.S.A.

The school owes its conception to the generosity of Mr. Charles H. Hackley, who presented the City of Michigan with six million dollars, and part of it was devoted to this technical education project. It is quite a foundry city, for 22 per cent. of the working population is employed in the making of castings. The school is magnificently equipped, but the cupola has been replaced by an electric furnace. Mr. George W. Cannon of the well-known Campbell Wyant & Cannon Foundry takes a great personal interest in the school as chairman of the donors committee. The booklet would have been improved if more information were given as to the syllabus and costs—if any—to the students' parents. It is splendidly illustrated and it is obvious that craftsmanship is emphasized.

Gray Iron Casting Process and Products. By C. O. Burgess. Published by the Gray Iron Founders' Society Inc., 210, National City, East 6th Building, Cleveland 14, Ohio, U.S.A. Price $1.50. Obtainable from the Penton Publishing Company, Limited, 2, Caxton Street, London, S.W.1.

The short introduction to this extremely interesting propaganda booklet states that about 12,000,000 (short) tons of grey iron castings are made annually in the States and that there has been a 40 per cent. increase in volume annually during the last decade. The brochure, which runs to 28 pages and is well illustrated, is divided into four sections:—(1) Functional advantages of castings; (2) economic advantages of the casting process as a manufacturing method; (3) grey iron *versus* other cast metals and (4) general conclusions. The second section when dealing with "weldments" becomes aggressive and details three outstanding cases where their replacement by castings has introduced very considerable economies. The pictures and supporting data have been well chosen and presented incisively. This is necessary as the American grey iron founder has recently had to meet some extravagant and unfounded claims by the "weldment" manufacturers.

Protected Cores

By "Tramp"

To protect cores from "burning-in" when used to form port-ways in heavy sections of cylinders and the like made in high-duty iron, resort is often made to tarring or coating the cores with some other preparation of a similar nature. Although this method protects the cores from metal penetration, occasionally the gases evolved during pouring are detrimental to the casting, being trapped on some important machined face, and thus cause the casting to be scrapped. Whenever possible in such cases, it is better if the design could be modified so as to allow of the port being formed by drilling a series of holes during the machining operations. Often, however, this is not possible, owing to the shape, and so the casting which could be produced quite easily in an ordinary grey iron—by leaving the iron to cool considerably before pouring—is a source of anxiety when poured with much hotter metal, as is necessary for many grades of high-duty irons.

Supplies of special highly-refractory material are not always available from which the cores could be made, thus they have to be made of the sand which is used for the general run of cores in the foundry, and other means have to be adopted to protect the cores from metal penetration. One method which has proved successful in such cases is to shroud the core in a thin metal casing, care being taken that the casing completely envelopes the job, and that there are no open joints through which the metal may penetrate into the core and still cause "burning in." Sheet metal surface should be used, preferably one which has been "tinned," so as to prevent any trouble from "blowing" or gas formation during pouring. A similar device could be adopted to protect slot cores when used in heavy sections, but possibly in this case the best means would be to eliminate cores altogether, and allow the engineer to machine the slots.

Institute of Metals Awards

The Council of the Institute of Metals has made the following awards of medals for 1952:—

Institute of Metals (*Platinum*) *Medal* to MR. W. S. ROBINSON, until recently president of the Consolidated Zinc Corporation, Limited, in recognition of his outstanding services to the non-ferrous metal industries in developing the Australian zinc/lead industry and the British zinc industry.

Rosenhain Medal to PROF. ANDRE GUINIER, Conservatoire National des Arts et Métiers, Paris, in recognition of his outstanding contributions in the field of physical metallurgy, particularly in connection with precipitation phenomena.

W. H. A. Robertson Medal to MR. C. E. DAVIES, for his Paper on "Cold-rolling of Non-ferrous Metals in Sheet and Strip Form."

Abrasives for Sand Blasting

The Mineral Resources Division of the Colonial Geological Surveys has issued a notice calling attention to the availability of certain non-siliceous abrasive minerals possibly suitable for sand-blasting purposes. It is believed that this may be of interest in view of the coming into force of the Blasting (Castings and Other Articles) Special Regulations, 1949, which in part II reads: "No sand or other substances containing free silica shall be introduced into any blasting apparatus." Copies of the notice may be obtained direct from Colonial Geological Surveys, Mineral Resources Division, Imperial Institute, London, S.W.7.

Notes from the Branches

Middlesbrough

The Middlesbrough branch of the Institute of British Foundrymen, which has its new meeting place this session in the new canteen of Head Wrightson & Company, Limited, at Thornaby-on-Tees, has had a very busy season since October last year. On October 12, Mr. J. Blakiston, of Halifax, gave an interesting lecture on "The Economics of Foundry Mechanization." This Paper had already been published and aroused much interest among members and consequently the attendance at the meeting was exceptionally good. It was evident that that demand for increased productivity was in the minds of many people. After the lecture there was a large number of questions for the lecturer to answer. It was evident that, in spite of the large sums of money involved in carrying out such mechanization, a good return was obtained. Members were not inclined, however, to take all the items as proven and sought clarification on certain points. It was obvious, however, that Mr. Blakiston knew his subject thoroughly and he was well able to satisfy all querists.

On October 26, the branch held its annual social evening when Mr. Colin Gresty, the National President of the Institute, was a guest. The Mayor of Thornaby and several other of the town's officials were also present. Mr. Frank Shepherd, the branch secretary, was M.C. on this occasion, which all agreed was among the best social evenings ever held by the branch.

On November 9, the branch was scheduled to receive a Paper entitled "The Production of Heavy Castings for Electrical Generating Equipment," by Mr. N. Charlton, of Newcastle-upon-Tyne. However, Mr. Charlton was, unfortunately, unable to attend, but a film on the same subject was shown instead.

On December 14, Mr. B. Levy, from London, gave a lecture to the branch on "Some Present-day Practices in Patternmaking." Mr. Levy's Paper was clear and concise and dealt with all the latest innovations in this particular field. He seemed to have conducted experiments with almost every type of medium, including plastics and aluminium. Many of the branch members were, or had been, patternmakers and a very lively discussion ensued. Mr. Levy proved himself to be very competent to answer all the questions which were put to him, and branch members agreed that the lecture had been most comprehensive.

Process Planning

On January 11, 1952, the first lecture in the New Year was given by Mr. S. L. Finch, of Leeds, on "Process Planning in the Steel Foundry." This was an entirely new field for many of the foundrymen, as in most works such planning is the work of the foremen or the works manager. Mr. Finch explained how a great deal of time, work and materials could be saved by the setting up of such a department. He had considerable experience in this line and had figures to substantiate the results obtained. The lecturer emphasized the part played by the fettling shop in the manufacture of steel castings. He said that this was part of the production of steel castings which cost the most money, and all planners should take note that the less fettling was required the better would be the profits from the foundry.

Mr. Catton, managing director of Mr. Finch's firm, was present at the meeting and he recommended to all foundrymen the setting up of a process planning department. He said that when the idea was first put to him he felt that the outlay was very large, but he now admitted it was worth it. His firm had reaped many benefits from it and he was always looking for further

(*Continued at the foot of Col.* 2)

Core-gum Causes Wasters

By "Coroner"

Core-gum, such as is used in the coreshop to ensure that cores made in halves are glued together prior to assembly in the mould, is sometimes used by a moulder to hold a core in position when adequate provision has not been made in the core-prints. Recently, the writer examined a number of complicated cylinder castings, many of which were defective to a greater or lesser degree on a face separating a bore from a port-way, the defect being along one edge of the port-way and resembling a series of small holes. Because of other detail on the cylinder, it was necessary to cast the port-way on the top, and as it was considered better to assemble all the various cores in the bottom-half and lower the top in position, it was necessary for the port-way core to be placed on the main core, a core-print being provided in the top box to fit down over the assembled cores. As the port-way core was not secured at any definite point in the bottom, it was possible that when the top was lowered that a core shift could occur, resulting either in a dirty casting due to the sand from the print being "crushed" and lodging in the mould, or one side of the casting being thinner than the other.

To avoid these defects, it was suggested that the core should be secured in position by means of a coat of core-gum along the face which rested on the main core. Whilst this technique was highly successful from the point of view of preventing wasters from the causes already stated, it was nevertheless the reason for a number of castings being scrapped. During pouring of the mould, the excessive heat caused the core-gum to give off gas bubbles which penetrated the still liquid or pasty metal, with the result that many were trapped and caused the defect mentioned. The discontinuance of core-gum for this purpose cured the trouble.

Wages and Hours of Labour

A new enlarged edition of the volume entitled "Time Rates of Wages and Hours of Labour, October 1, 1951," compiled by the Ministry of Labour and National Service, has been published by H.M. Stationery Office, (Price 6s. 6d. net). This is the sixth annual edition of a volume which shows, for the more-important industries and occupations, the minimum or standard time-rates of wages of wage-earners as fixed by (*a*) voluntary agreements made between organizations of employers and workpeople, or (*b*) by Joint Industrial Councils and similar bodies, or (*c*) by Statutory Orders under the Wages Councils Act, the agricultural-wages Acts and the catering-wages Act. In addition to time-rates of wages particulars are given of the normal working hours, and, where available, the basic rates for pieceworkers and the additional rates payable to shift-workers and night workers and the arrangements, where they exist, for a guaranteed weekly wage. The new volume also contains the rates of wages for juveniles in a selection of industries, overtime rates of pay and the arrangements for paid holidays in the principal industries. This information is given in three appendices.

In making use of this volume as a source of reference, it is important to bear in mind that the information it contains relates to the position as at October 1, 1951.

extensions of its scope. After the Paper was over, there was a very prolonged discussion and many members conceived the notion that it might be beneficial if such a department was set up in all foundries.

Institute Elects New Members

At a meeting of the Council held at the Queen's Hotel, Birmingham, on January 19, the following were elected to the various grades of membership of the Institute of British Foundrymen.

FIRST LIST

As Members

M. W. Barlow, fero-alloy manufacturers' manager, Foundry Services, Limited, Birmingham; W. Bath, foundry superintendent, Anti-Attrition Metal Company, Limited, Maidenhead; F. J. Charlton,* manager, J. W. Thompson (Ironfounders), Limited, Sunderland; N. Douzinas, marine superintendent, North American Shipping & Trading Company, London; C. D. Drysdale, M.B.E., works director, Drysdale Bros. (Larbert), Limited, Larbert, Stirlings; W. B. Eddy, ironfoundry manager, Teesdale Ironworks, Thornaby-on-Tees; S. L. G. Fry, foundry superintendent, Kent Alloys, Limited, Rochester; F. Gaiger, foundry production manager, John Harper & Company, Limited, Willenhall, Staffs; L. C. H. Griffiths,* workshop lecturer, Heanor Technical Institute, Derbys; T. Hawthorn, head foundry foreman, Wilmer Lea Foundries, Stratford, London; R. C. Leppington, director, Hale & Hale (Tipton), Limited, Tipton, Staffs; W. C. Ray,* foundry manager, McKechnie Bros., Limited, Birmingham, 16; A. S. H. Sawers,* general manager, The Aluminium Castings Company, Limited, Greenock, Scotland; F. Shepherd,* director and personnel manager, Head, Wrightson & Company, Limited, Thornaby-on-Tees; S. Silcock, equipment engineer, Sterling Metals, Limited, Coventry; W. Steven, B.Sc., Ph.D., research metallurgist, Mond Nickel Company, Limited, Birmingham, 16; H. J. Thompson, sales manager, Foundry Equipment, Limited, Leighton Buzzard; W. E. Welsby, works manager (director), Golden Hill Foundry, Limited, Goldenhill; A. Wilson,* foundry engineer, Colombo Commercial Company, Limited, Ceylon; J. K. H. Wong, factory manager and chief engineer, Trans-continental Corporation of Brazil and South America, Rio de Janeiro, Brazil; T. W. Wynn, general manager, Bersham Foundry, near Wrexham.

As Associate Members

G. H. Binnie, works manager, Nigerian Railway, Mechanical Department, Nigeria; B. Bland, engineer's patternmaker, chargehand, G. Perry & Sons, Limited, Leicester; H. W. Bonser,* technical representative, Bradley & Foster, Limited, Darlaston, Staffs; A. C. Bowie, brass moulder, Glenfield & Kennedy, Limited, Scotland; A. Brown, iron moulder, Glenfield & Kennedy, Limited; A. J. Bunting, foreman metal patternmaker, G. Perry & Sons, Limited; H. L. Carey, assistant to steel foundry manager, Vickers-Armstrongs, Limited, Newcastle-upon-Tyne; S. K. Chakrabarty, brassfoundry superintendent, Tatanagar Foundry Company, Limited, India; G. D. Cheesman,* assistant metallurgist, Dartmouth Auto Castings, Limited, Smethwick; J. Dixon, foundry foreman, Parkinson Stove Company, Limited, Birmingham; R. Drysdale, iron moulder, Glenfield & Kennedy, Limited; W. J. Fairey, die-casting foundry superintendent, Educational Supply, Stevenage, Herts; J. H. Garner, patternmaker (chargehand), Newman's, Limited, near Bristol; A. K. Ghosh, student, National Foundry College, Wolverhampton; J. G. Haughie, assistant foundry manager, Mirrlees Watson Company, Limited, Glasgow; J. Hurst, moulder foreman, Glenfield & Kennedy, Limited; K. L. Jay, manager and partner, L. C. Jay & Son, Norwich, Norfolk; J. F. Keith, assistant metallurgist, G. & J. Weir, Limited, Glasgow; D. Lane, foundry foreman, Newton Chambers & Company, Limited, Sheffield; J. D. Larn, laboratory assistant, Bristol Aeroplane Company, Limited, Bristol; J. D. Lickely, technical service engineer, synthetic-resin corebinders; British Industrial Plastics, Limited, Oldbury; L. Magee, assistant manager, English Steel Corporation, Limited, Sheffield; F. E. Maine, foreman moulder, Head Wrightson & Company, Limited; J. McM. Matchett, foreman moulder, Low & Duff's, near Dundee; R. McAllister, chemist and metallurgist, Mirrlees Watson Company, Limited; K. MacNaughton, foreman patternmaker, Shanks Ironfounders, Limited, Arbroath; D. Peacock, sand foundry manager, Daralum Castings, Limited, Darlington; J. Pickstone, foundry manager, Berry's Foundry, Halifax; J. Robertson, chargehand, Glenfield & Kennedy, Limited; J. Scahill, secretary and partner, Scahill Bros., Huddersfield; G. J. Shaw, research student in industrial metallurgy, Birmingham University; T. H. Simmons, technical representative, British Industrial Plastics, Limited; F. C. Smith, foreman patternmaker, Lake & Elliot, Limited, Essex; J. G. F. Spicer, chief inspector and head of progress and planning department, Jarrow Metal Industries, Jarrow; J. Taylor, patternshop foreman, Duport Foundries, Limited, Dudley Port, Staffs; J. Taylor, foreman patternmaker, Excel Patterns, Coventry; J. E. R. Tompkin,* student founder, Rice & Company, Limited, Northampton; J. Traynor, foreman moulder, S. Russell & Sons, Limited, Leicester; R. J. Tyler, foundry manager, Gibbons Bros., Limited, Dudley, Worcs; L. E. Wade, die-foundry manager, Daralum Castings, Limited; H. A. Wincer,* assistant to the manager, Ransomes, Sims & Jefferies, Limited, Ipswich; R. A. Withers, foundry foreman, S. Russell & Sons, Limited.

As Associates (*over* 21)

N. Addison, ironfoundries commercial manager, Head Wrightson & Company, Limited; G. E. Booth, student, National Foundry College (Follsain Wycliffe Foundries, Limited, Lutterworth); D. St. A. Brazier, laboratory assistant, Dartmouth Auto Castings, Limited; G. J. Fountain, assistant foundry foreman, Midland Electric Manufacturing Company, Limited, Birmingham; J. Heap, student, National Foundry

* Transferred.

Institute Elects New Members

College; R. W. Hutchinson, metal moulder, English Electric Company, Rugby; H. Kauserud, student, National Foundry College; C. Luthold, student, National Foundry College; F. Marshall, B.Met., H.M. Forces, Preston; G. H. Miller, assistant foundry manager, Chamberlin & Hill, Limited, Walsall; A. Pyrah, student, National Foundry College (Sheepbridge Engineering, Limited); E. J. Reeves, loose pattern moulder, S. Russell & Sons, Limited; R. L. Rice, assistant works manager, Pinhoe Engineering & Foundry Company, Limited, Exeter; W. A. F. Sargeant, student, National Foundry College (Hope Works, Limited, Walsall); G. B. Taylor, laboratory assistant, I.C.I. Metals, Limited, Smethwick.

As Associates (under 21)

C. Ashun, apprentice moulder, Gold Coast Government Railway; B. Barrett, apprentice moulder and coremaker, A. Herbert, Limited, Coventry; S. N. Barriscale, junior chemist, Imperial Foundry Company, Leamington; A. M. Bennett, foundry technical apprentice, W. & T. Avery, Limited; J. J. Bridgman, apprentice patternmaker, Wimbledon Foundry, Wimbledon; R. J. Campbell, apprentice patternmaker, Argus Foundry, Limited, Thornliebank; G. B. Cantley, patternshop apprentice, Mavor & Coulson, Limited, Glasgow; A. J. Chappell, apprentice patternmaker, Newmans, Limited, near Bristol; H. J. Dunbar, apprentice patternmaker, Carntyne Steel Castings, Limited, Renfrews; J. L. Grout, foundry apprentice, Manlove, Alliott & Company, Limited, Nottingham; S. L. Hill, laboratory assistant, African Malleable Foundries, Transvaal, South Africa; R. C. Humphreys, sand control laboratory assistant, Midland Motor Cylinder Company, Limited, Smethwick; A. Jackson, apprentice moulder, Harland & Wolff, Limited, Glasgow; A. Lapinsky, metallurgical assistant, African Malleable Foundries, Benoni, South Africa; H. S. C. Middleton, foundry technical apprentice, W. & T. Avery, Limited; E. Morton, apprentice founder, Victor Moyle & Company, Limited, Hampton Wick; F. S. McKay, apprentice metallurgist, Shanks Ironfounders, Limited, Arbroath; J. A. Partridge, special foundry apprentice, Stanton Ironworks Company, Limited, Nottingham; J. G. Phillips, student, National Foundry College.

SECOND LIST

As Subscribing Firm Member

Neptune Brass & Aluminium Company, Limited, Treforest, Glam., makers of bronze and aluminium castings (representative: J. S. Adamson).

As Members

A. J. Gough, foundry manager, Henry Wilson & Company, Limited, Liverpool; W. C. Long, master foundryman, W. C. Long & Son, Surrey; G. W. Taylor, foundry development engineer, Textile Machinery Manufacturers, Limited, Oldham; A. E. Wiles,* assistant foundry manager, British Northrop Loom Company, Limited, Blackburn.

As Associate Members

J. Barrett, foreman coremaker, Broadbent & Son, Ashton-under-Lyne; A. J. Berry, assistant foreman, Metalclad, Beaufort Works, Morriston, Swansea; A. H. Cannard, leading moulder, Brown, Lenox & Company, Pontypridd; G. Cloete, patternmaker, Prima Iron & Steel Company, Benoni, Transvaal; J. B. Domville, foreman patternmaker, Curran Steels, Penarth Road, Cardiff; J. Ferguson,* patternmaker, North British Steel Foundry, Limited, Bathgate; J. G. Gilchrist, moulder and coremaker, Furnival & Company, Limited, Reddish, Stockport; K. Hodkinson, assistant foundry engineer, Leyland Motors, Limited, Lancs; E. Hulme, coremaker, Furnival & Company, Limited; J. Ivers, metallurgist, National Gas & Oil Engine Company, Limited, Ashton-under-Lyne; E. Kenny, journeyman moulder, S. Maley, Limited, Oldham; S. A. Knagg, foundry foreman, Malayan Railway, Kuala Lumpur, Malaya; F. A. Knowles, partner, The Engineering Pattern Works, Cardiff; C. C. Knox,* assistant foundry engineer, Henry Wallwork & Company, Limited, Manchester; A. Lownley, foreman moulder, Henry Livesey, Limited, Blackburn; G. Mellor, foundry foreman, Platt Bros. & Company, Limited, Oldham; S. Millard, foreman iron moulder, L. Gardner & Sons, Patricroft, Eccles; J. McIlwraith, foundry manager, H. Broadbent & Sons, Limited; H. S. Paul,* foundry chargehand, Locomotive Workshops, E. I. Rly; C. Pothecary, technical representative, Foundry Services, Limited, Cardiff; W. B. Rodgers, foreman patternmaker, H. Broadbent & Sons, Limited; F. Rogers, moulder, David Bridge & Company, Limited, Rochdale; H. Sidebottom, in charge of progress and planning, H. Broadbent & Sons, Limited; N. Smith,* floor moulder, Billington & Newton, Limited, Longport, Stoke-on-Trent; W. L. Stein, foundry foreman, Catton & Company, Limited; W. T. Stewart, foundry manager, Matthew Swain, Limited, Manchester; D. Stott, technical assistant, Cooper Bros., Limited, Burnley; J. Turner, assistant works manager, Cooper Bros., Limited.

As Associates (over 21)

J. J. Carroll, foundry metallurgist, Hepworth & Grandage, Limited, Bradford; R. F. W. Cox, production planning and time study engineer, Goulds Foundries, Limited, Newport, Mon; S. C. Ghose, graduate apprentice, Craven Bros. (M'chester) Ltd., Reddish; G. P. Murfin, foundry planning engineer, Wright Boag & Head Wrightson, Limited, Transvaal; D. Robinson, foundry metallurgist, Berry's Foundry (1949), Limited, Halifax, Yorks.

As Associate (under 21)

S. P. B. Germishuizen, apprentice patternmaker, J. Barwell, Limited, Transvaal.

THIRD LIST

As Members

R. Barber, chartered secretary, British Steel Founders' Association, Sheffield; M. M. Hodgson,* assistant foundry manager, North Eastern Marine Engineering Company (1938), Limited, Wallsend; F. D. Kirby, non-ferrous foundry manager, A. G. Wild & Company, Limited, Sheffield; C. Nicholls,*

(*Continued on facing page, col. 2*)

* Transferred.

Institute of Metals

Annual General Meeting

The 1952 annual general meeting of the Institute of Metals will be held in London from March 24 to 27. All the scientific and technical discussions will be held at the Park Lane Hotel, at which a luncheon and a dinner-dance will also be held. As recommended by the meeting's sub-committee, the "May" Lecture will be delivered (at the Royal Institution) on the evening of the first day of the meeting, while on another evening an inexpensive and informal conversazione and exhibition will be held at 4, Grosvenor Gardens. The secretary will be glad to receive offers of suitable exhibits for the conversazione. Visits to works and laboratories are being arranged in connection with the meeting and an innovation will be the holding of simultaneous scientific and technical sessions on widely differing subjects. A detailed programme is given below:—

Programme

Monday, March 24, 6 p.m.:—Forty-second Annual May Lecture, by Dr. J. J. P. Staudinger on "The Place of Plastics in the Order of Matter," in the lecture theatre of the Royal Institution, Albemarle Street, London, W.1.

Tuesday, March 25, at Park Lane Hotel, Piccadilly, W.1:—

10.30 a.m. Business meeting and Presidential Address, by Dr. C. J. Smithells.

1 p.m. Luncheon (tickets 18s. 6d.), followed by presentation of medals.

2.45 p.m. Scientific Session. The following papers wil be discussed:—"Production and Properties of Oxide-reduced Copper Powder," by Ellwood and Weddle; "Unrelated Simultaneous Interdiffusion and Sintering in Copper/Nickel Compacts," by Butler and Hoar; "Sintering of Copper/Zinc Powder Compacts," by Howat, Craik, and Cranston; and "Creep and Softening Properties of Copper for Alternator-rotor Windings," by Benson, McKeown, and Mends.

7 for 7.30 p.m. Dinner-dance, at the Park Lane Hotel, Piccadilly, London, W.1, evening dress, with decorations (tickets, price 30s. each).

Wednesday, March 26. Session "A," at the Park Lane Hotel. 9.30 a.m. Symposium on "Equipment for the Thermal Treatment of Non-ferrous Metals and Alloys," arranged by the metallurgical engineering committee. An all-day general discussion, based on the following papers:—"Electric Furnaces for the Thermal Treatment of Non-ferrous Metals and Alloys," by Evans, Hancock, Haywood, and McMullen; "Gas Equipment for the Thermal Treatment of Non-ferrous Metals and Alloys," by Waight; "Batch and Continuous Annealing of Copper and Copper Alloys," by Davis and Temple; "Bright Annealing of Nickel and its Alloys," by Hartley and Bradbury; "Batch Thermal Treatment of Light Alloys," by Paton; "Flash Annealing of Light Alloys," by Staples; and "Continuous Heat-treatment of Aluminium Alloys of the Duralumin Type," by Lamourdedieu.

Session "B." 9.30 a.m. Scientific session, when the following papers will be discussed:—"Hardness and Strength of Metals," by Tabor; "Some Observations on the α-β Transformation in Titanium," by McQuillan (A. D); "Application of Hydrogen Equilibrium-pressure Measurements to the Investigation of Titanium Alloy Systems," by McQuillan (A. D.); "Constitution of Titanium-rich Alloys of Iron and Titanium," by Worner; "Titanium/Hydrogen System for Magnesium-reduced Titanium," by McQuillan (A. D.); "Provisional Constitutional Diagram of the Chromium/Titanium System," by McQuillan (M. K.); "X-Ray Study of the Phases in the Copper/Titanium System," by Karlsson; "Structure and Some Properties of Titanium/Oxygen Alloys Containing 0-5 At.-% Oxygen," by Jenkins and Worner; "Heat-treatment of Titanium-rich Titanium/Iron Alloys," by Worner; and "Effect of the Elements of the First Long Period on the $\alpha \rightleftharpoons \beta$ Transformation in Titanium," by McQuillan (A. D.).

2.30 p.m. "Mechanism of Precipitation in Aluminium/Magnesium Alloys," by Perryman and Brook; "Experiments on the Reaction of Aluminium/Magnesium Alloys with Steam," by Swain; "Mechanism of Stress-corrosion in Aluminium/Magnesium Alloys," by Edeleanu; and "Ageing Characteristics of Binary Aluminium/Copper Alloys," by Hardy.

8 p.m. At 4, Grosvenor Gardens, S.W.1, Conversazione and Exhibition. Guests will be welcome. (Tickets, price 3s. 6d.)

Thursday, March 27. Programme "A," 10 a.m. Works visits. Members only may be accepted for these visits, tickets for which can be obtained from the secretary. As numbers for each visit are strictly limited, an order of priority should be stated when making application for a ticket. (Price of ticket, 5s., inclusive of transport.) Ford Motor Company, Limited, Dagenham, all-day visit; and J. Stone & Company (Charlton), Limited, Charlton, morning visit.

Programme "B." 9.45 a.m. At the Park Lane Hotel. Arranged by the metal physics committee, the following papers will be discussed:—Themes: Fatigue, "Some New Observations on the Mechanism of Fatigue in Metals," by Wood and Head; and "Some Metallographic Observations on the Fatigue of Metals," by Forsyth. Plastic Deformation, "Slip and Polygonization in Aluminium," by Cahn; "Inhomogeneities in the Plastic Deformation of Metal Crystals," by Honeycombe; and "Slip-bands and Hardening Processes in Aluminium," by Brown.

2.15 p.m. Visits to laboratories; as numbers for each visit are limited, an order of priority should be stated when making application. (Price of tickets, 4s. 6d., including transport.) British Iron and Steel Research Association Research Laboratories, Physics Department, 140, Battersea Park Road, S.W.11; General Electric Company, Limited, Research Laboratories, Wembley; and Mond Nickel Company, Limited, Precious Metal Refinery, Acton.

Institute Elects New Members

(Continued from facing page)

chief assistant metallurgist, North Eastern Marine Engineering Company (1938), Limited; W. S. Spenceley,* foundry manager, J. Berry, Limited, Swinton, Lancs.

As Associate Members

C. S. Bosworth, patternmaker, Harrison & Company, Lincoln; W. G. Hale, brassfoundry foreman, British Railways, Gorton, Manchester; J. R. Robinson, metallurgist, Clarke Chapman & Company, Limited, Gateshead.

JOHN MILLS & COMPANY (LLANIDLOES), LIMITED, have had plans approved to carry out extension of the Railway Foundry, Llanidloes.

Increases of Capital

The following companies are among those which have recently announced details of capital increases:—

IRVING ENGINEERING COMPANY, LIMITED, Woodchester, near Stroud (Glos), increased by £24,000, in £1 shares beyond the registered capital of £16,000.

ALFRED HERBERT, LIMITED, machine tool, makers, etc., of Coventry, increased by £1,100,000, in £1 ordinary shares, beyond the registered capital of £1,000,000.

W. J. JENKINS & COMPANY, LIMITED, gas engineers, etc., of Retford (Notts), increased by £50,000, in £1 ordinary shares, beyond the registered capital of £100,000.

GEO. JOWITT & SONS, LIMITED, abrasive wheel manufacturers, of Sheffield, increased by £95,000, in £1 ordinary shares, beyond the registered capital of £5,000.

HARPER PHILLIPS & CO., LTD., manufacturers of ships propellers, engineers, ironfounders, welders, etc., Albion Foundry, Eastgate, Grimsby, increased to £20,000.

ANCHOR CHAIN COMPANY, LIMITED, Oldham (Lancs), increased by £14,000, in £1 5 per cent. cumulative redeemable preference shares, beyond the registered capital of £10,000.

E. PASS & COMPANY, LIMITED, gas and water engineers, etc., of Manchester, increased by £16,575, in £1 5 per cent. cumulative preference shares, beyond the registered capital of £21,000.

JOSEPH KAYE & SONS, LIMITED, lock makers, etc., of Leeds, increased by £29,712 10s., in 3s. 4d. 4 per cent. cumulative redeemable preference shares, beyond the registered capital of £30,000

PRINCE-SMITH & STELLS, LIMITED, manufacturers of textile machinery, etc., of Keighley (Yorks), increased by £200,000, in £1 "A" ordinary shares, beyond the registered capital of £400,000.

ERNEST DOE & SONS, LIMITED, agricultural engineers, of Maldon (Essex), increased by £50,000, in 15,125 5 per cent. cumulative preference and 34,875 ordinary shares of £1 each, beyond the registered capital of £150,000.

W. B. WHITE & SONS, LIMITED, textile machinists, of Colne (Lancs), increased by £25,000. in £1 ordinary shares, beyond the registered capital of £25,000. The £5 shares have been sub-divided into five shares of £1 each.

BRITISH FEDERAL WELDER & MACHINE COMPANY, LIMITED, Brierley Hill (Staffs), increased by £60,000, in 5s. shares, beyond the registered capital of £40,000. The capital has been reorganized and is now £100,000 in 5s. ordinary shares.

Welsh Bar Mill to Close

It was announced last week by the Steel Company of Wales, Limited, that the bar mill at the Port Talbot Steelworks is to be closed from June 30. The mill started operations in 1902 and produces an average of 3,000 tons of steel rails and sleepers for domestic use and export. The closure means that the sleeper plant, fish plate plant, and the rolling shop at the Port Talbot Steelworks, and the rail bank at Margam Steelworks will also close. About 480 workers are affected by the decision.

An official of the company stated that it was the intention to concentrate all available steel supplies towards maintaining the highest possible output at the new Abbey Works hot strip mill, and thus to expand the manufacture of flat-rolled products, principally sheets and tinplates.

German Steel Exports

Western Germany exported 1,776.000 tons of iron and steel, valued at D.M.1,350,000.000. in 1951, against 1,518,000 tons valued at D.M.750,000,000 in 1950. Exports in 1950 corresponded to 17.4 per cent. of total production, rising to 18.2 per cent. in the following year. It must be remembered, however, that 550.000 tons were delivered to the United States in exchange for American coal.

In the course of 1951 Western Germany imported about 8.000,000 tons of iron ore and, on the basis of agreements concluded with exporting countries, it is hoped to import at least 9,000,000 tons this year.

Notification of Vacancies Order

The Notification of Vacancies Order, 1952, which comes into operation on February 25 is designed to ensure that work which is in the national interest (for defence and exports) shall have priority over less essential work. To this end, all those who want to change their employment and all those who are looking for work are to be guided into suitable jobs. There will be no "direction" to work as there was under the old Control of Engagement Order and persons covered by the Order are under no obligation to take jobs they do not want. All that will happen will be that they will be told of the important vacancies and asked to take them willingly. If they do not want these jobs they will be offered vacancies in the kind of work they desire.

Scope of Restrictions

With certain exceptions, the Order restricts and controls the way in which employers may seek to engage or start any man between 18 and 65 years of age (women 18 and 60 years) and requires engagements within its scope to be sought and made through an employment exchange or a scheduled employment agency. The exceptions include part-time work, and employment in a managerial, professional, administrative or executive capacity as well as some special cases. The employer can still advertise, but the advertisement must make it plain that applicants for a job must apply to an employment exchange or scheduled agency. Further information can be obtained from any employment exchange, where a leaflet explaining the Order is also available.

Northern Ireland's Steel Supplies

As a result of a recent visit to London by representatives of the Northern Ireland Parliament, an improvement in Northern Ireland's steel supplies has now been promised. In the April quarter it is hoped that the overall quota will be raised by a substantial amount. Structural steel will also be more plentiful.

The Minister of Finance, Major J. M. Sinclair, has disclosed that the first-period allocation has been increased, and that greater quantities will be received thereafter. Major Sinclair, who saw Lord Swinton earlier this month, told the Ballymoney Chamber of Commerce recently that he hoped the Government's efforts would lead to a further stepping-up.

At present, the Ministry of Commerce is only responsible for supplies to firms which use small amounts of steel. Larger concerns have direct contact with the Ministry of Supply.

Tredegar Iron & Coal Repayment

The Tredegar Iron & Coal Company, Limited, announces interim compensation payments under the Coal Industry Nationalisation Act, the company and its subsidiaries having received £593,640 of 3½ per cent. Treasury stock (1977-80).

The stock was issued at 88½ per cent., and represented compensation to the amount of £523.888, representing roughly 60 per cent. of the approximate amount which will probably be due to the group for colliery assets under the South Wales agreement.

The whole of the stock has been sold and the board proposes to utilize the major portion of the proceeds in repaying 4s. per ordinary share, thereby reducing the nominal value of the shares from 14s. to 10s.

Further Discussion of Resin in Foundry Practices*

At a recently-held meeting of East Midlands and Lincolnshire members of the Institute of British Foundrymen, the Report of Sub-committee T.S. 30 of the Institute, "Synthetic Resins in the Foundry†," was presented by two members who served on it—Mr. G. L. Harbach, A.I.M., and Mr. P. G. Pentz, B.SC., the former presenting the practical foundryman's viewpoints and the latter those of the resin manufacturer. What follows is an abridged report of the discussion which later took place, wherein many operational factors were dealt with in an informative manner and a number of practical notions disclosed.

MR. HAWLEY said that, as one of the staff of a firm using resins with success, he would like to draw attention to the economic aspect of the subject. Before adopting U.F. resin the foundry used oil-impregnated starch as a bonding material, and a 30 per cent. reduction in sand cost has been effected by using less than 1 per cent. of resin and less than 1 per cent. of cereal—although both speakers had mentioned higher percentages. Mr. Harbach had referred to more extensive venting when using U.F. resins, but this had not been found necessary. When using a higher percentage of resin, "blown" castings and also core-sagging might be encountered.

Using less than 1 per cent. resin his firm dried the cores in an Acme-type, vertical stove at 250 deg. C. to 270 deg. C., the drying cycle being reduced from 100 min. (with the oil-sand cycle) to 80 min., all cores being dried in this time. Although some uncured resin might then remain in the centre of a core, this would subsequently be cured by the residual heat. He had not experienced trouble with over-baking or friability. In a batch-type stove, using U.F. resin 1 per cent., cereal 1 per cent. they achieved a 10 per cent. economy over the cost of oil-sand. The cores varied in weight from 2 lb. to 2 cwt., and there was no sign of over baking or friability after a 12 hour drying cycle at 200 deg. C.

Parting Compounds and Fumes

Parting compounds had a marked effect on the green-strength and dry-strength of cores necessitating the use of more cereal and resin. When cores were sprayed with water, parting compounds had no great effect on the skin but the sand underneath was very friable and if the core had to be rubbed it was a very difficult job to handle, using any kind of parting compound, which was actually mixed with the sand. He had used a paraffin-and-oil mixture satisfactorily on wooden or metal coreboxes and also soapy water which was recommended by one resin manufacturer. The Brassfoundry Productivity Report referred to the application of a soap solution to the corebox, leaving the box to dry with a resultant hard skin. The advantage when using the box for a long run was that one application only was necessary, whereas with parting compound it was usually necessary to apply it to the box after every ten or twelve cores. He had not done much work on P.F. resins as they offered no economic advantages over U.F. resins. However, in a foundry using 20 tons of U.F. cores a week he had had no complaints of fumes, as the foundry atmosphere was definitely less objectionable than when using oil-bonded sands.

MR. HARBACH said it was gratifying to know there was a member present who could speak so confidently of the successful use of resin in the coreshop.

Accelerators

MISS RUSSELL said Mr. Hawley had rather stolen her thunder and mentioned most of the points she was going to refer to. However, one of the things which had not been mentioned was accelerators. An addition of boric acid equivalent to 1 oz. per 1 lb. of resin reduced the baking time of a tensile test-piece by about ten minutes and increased the dry-strength by 5 or 10 lb. In a continuous stove, small cores baked quickly enough without an accelerator. The rate of baking of large cores was governed by the rate at which moisture could escape, and as this was slower than the rate of curing, the addition of accelerators was not advantageous. Could the speakers say whether the latter were widely use?

MR. PENTZ in reply said that as far as he knew no one was using accelerators with U.F. resin in this country. The Swiss had developed the use of catalysts which enabled cores to be hardened without stoving at all; and there were various "half-way houses"; one could set the core by adding an accelerator without any heat whatever, or one could use less accelerator and only moderate heat. He agreed that the advantages were small.

With reference to the point raised by Mr. Hawley as to the percentage of resin and cereal, recommended amounts were reduced over a year ago to less than 1 per cent. resin and 1¼ per cent. cereal. The amount depended on a number of other factors, such as the grade of sand, and whether one could operate at a high moisture content. This brought in the question of parting compounds: he thought they were very useful. Many people were using these parting compounds even when not using resin, in coreblowing for instance. The use of a parting compound reduced the green-strength and dry-strength, but enabled one to operate at a higher moisture content. The higher moisture content greatly improved the dry-strength, so that on balance the effect of the parting compound was, indirectly, to reduce the proportion of resin needed to obtain the requisite dry-strength. The reduction in green-strength varied in accordance with the initial green-strength and type of resin. He had not observed cases of a parting compound giving skin hardness. As to the use of soap, he agreed that this surface treatment could be effective. The use of various types of releasing agent could be very helpful. Parting agents might contain a surface-active material which tended to form a film on the box. He thought, on balance, that there were definite arguments in favour of using such compounds. The importance of keeping down costs, by keeping the proportion of resin or other ingredients to a minimum, was obvious.

* Report of a combined meeting of the East Midlands and Lincolnshire branches of the Institute of British Foundrymen, with Mr. S. P. Russell in the Chair.

† Original Report published in the JOURNAL, July 5, 1951.

Further Discussion of Resin in Foundry Practice

Actual Temperature of Cores

MR. HARBACH referring to the continuous-type stove, said it was very doubtful if the temperature recorded was the actual temperature at which cores were baked. He thought if one determined the actual temperature of the cores it was considerably lower. A batch-type stove required a lower recorded temperature than the continuous type—nearly 50 deg. C. difference between the batch-type and Acme type.

MISS RUSSELL said the results obtained in the batch-type stove operating at 200 deg. C. were comparable with those obtained in the laboratory oven at 200 deg. C. measured with a mercury in glass thermometer.

MR. HARBACH said he would not disagree, but he did emphasize there might be a difference of the order quoted in recorded temperatures between batch and continuous stoves.

Shell-moulding

MR. PENTZ, replying to a query from the Chairman (Mr. S. P. Russell) about the shell-moulding or "C" process said the process from the resin angle was straightforward. A blend was made of finely-powdered resin and fine sand, 100, 150 or even 200 mesh. The resin and sand were dropped on to a heated pattern where a skin was formed in a matter of seconds. This crust, or shell on the heated metal pattern was then placed in the oven at 260 to 315 deg. C and cured in a matter of four minutes or so. The mould or core was stripped from the pattern and was immediately ready for use, or could be stored for a year or so. Most of the work had been done by using P.F. resin. The advantages peculiar to that type of resin were low gas content and excellent moisture resistance. Recently good results had been reported with U.F. resin, but this type might suffer because of its lower moisture resistance. Britain might be ahead of America in this development. The idea there was that only P.F. resins were suitable for shell-moulding. The fact that promising work had been done with U.F. resin in this country gave us a definite lead. In relation to price, the position was that U.F. resins were cheaper than P.F. and were likely to remain so The urea (raw material) cost about 4d. per lb. whilst phenol (raw material) was 1s. 6d. per lb. At the present stage he thought there were more advances to be made on the foundry side than the resin side. There might be quite a number of engineering problems to overcome to make the process a success. (He was assuming the process itself was well known.) From the resin aspect, the major problem was the question of the flow properties of the resin and the way it behaved when it first dropped on to the pattern. The extent to which one got an accurate reproduction of the pattern depended on the way the resin flowed to form a crust. It would be useful if firms would collaborate by exchanging information on this subject. This remark also applied to the ordinary use of resin.

Core-blowing and Re-use of Resin Sand

MR. GARDOM (past president) said there were four questions he would like to ask. Had any work been done on core-blowing using resin-bonded sands? Had anyone been able to use such a sand on a Sandslinger? When resin-bonded sand was returned to the sand system, was it detrimental to the moulding sand and, after casting, was it possible to re-use the sand for core-sand preparation? With reference to the temperatures of continuous stoves, he had installed the first continuous stove in this country at Dagenham and it had a great deal of control. It was a gas-fired stove. The actual temperatures obtained in the cores were recorded by inserting a pyrometer in a block core and allowing it to travel round the stove. Temperatures recorded in this way were higher than those shown on the permanent recorder attached to the core stove. The stove was twice as high as they were to-day.

MR. HARBACH said the point about temperatures was that it was not possible to state a particular temperature as being satisfactory for all types of stoves. The recorded temperature acted as a guide and, when good baking practice had been established, enabled comparative values to be retained.

Due to stickiness, it was very difficult to make resin-bonded cores by blowing. However, this was the third meeting at which he had given this Paper, and he had found core-blowing was quite popular using a standard mixture, sometimes using bentonite. One firm was making all its cores by blowing but they were not very large ones. There was no reason why Sands'lingers should not be used. Also, there was no reason why burnt sand should be detrimental from the moulding angle but there would be a reduction in green-bond strength. He could not say anything useful as to the re-use of returned resin sand for core-sand, but perhaps Mr. Pentz would comment on this aspect.

MR. PENTZ said he knew of one foundry where they re-used up to about 60 per cent. return sand, but more binder was needed. With reference to this question of returned sand it was important to notice a distinction between U.F. resin and P.F. resin. P.F. resin did not break down quickly. There was a tendency to get more core-sand into the moulding-sand system with U.F. resin, as it broke down rapidly. Sandslinging was being done to a small extent with resin-bonded sand. The problems would be more or less of the same character as with oil-sand. Core-blowing was being carried out to a large extent, but it was often necessary to reduce the moisture content, and this made the process less economical than it would otherwise be.

Resin Supply

MR. HEARNSHAW said he understood both speakers to say that U.F. and P.F. resins were indigenous materials. Was it not a fact that P.F. resin was in short supply and was obtained from America? Another point, was there not much work being done with cresylic resin?

MR. PENTZ said it was quite true that phenol, the raw material for P.F. resins, was in short supply at the moment, but the greater part of this country's requirements was home produced. A small amount was being imported from America and a little was being obtained from Japan and Western Europe. Something of the order of 900 tons of phenol would probably be imported into this country during the first half of the year as against requirements of some 6,000 tons, the balance being met from British production, apart from a small deficit. One could procure much more imported phenol, but unfortunately this would raise the price of resin.

As to cresylic resin; he was using the term "phenolic resin" to cover this type also. The manufacture of cresylic resin binders presented certain problems, as the raw material was a mixture of cresols and not a pure chemical compound and its use made the resin manufacturer's task more difficult. However, cresylic resins were being developed and were likely to increase in use at least while the shortage of phenol remained as much in evidence as at present.

High-speed Core-blowing

MR. J. HILL, referring to the point raised regarding core-blowing, asked if the lecturers were quite happy

that a synthetic-resin mixture had been developed for high-speed core-blowing.

MR. PENTZ said it was perfectly true, as Mr. Hill implied, that blowing cores with resin-bonded sand was not entirely easy, but, if one could reduce the moisture content of the resin-sand mixture, there was no particular problem. He knew of foundries where they were blowing cores as fast, and faster, than with semi-solids or oil bonds. One had to be more careful than when using oil, particularly with the types of resin used to date. Resin was an adhesive and not a lubricant like oil. With straight-blown core jobs, no extra venting was necessary. There was, however, more difficulty when one had to get the sand to go round a corner. Research on this problem was being undertaken to ascertain the nature of the flow properties required under such conditions and which it was hoped would throw some new light on this problem. When the factors which governed it had been ascertained, one might be able to translate these into terms which would enable the makers to re-design the resins themselves in such a way as to improve the blowing properties of sands bonded with them.

MR. TIPPER on this same subject said it was usually necessary to prepare special core mixtures to meet particular conditions. As an example, he recently had a problem referring to the blowing of crank-case cores weighing about 60 lb. each. They were about 14 in. high, and were being made very successfully in oil-bonded sand, that is to say, an oil/cereal mixture. Attempts had already been made to use a U.F. liquid resin and cereal, but failed primarily owing to the core sagging and losing its dimensions. By using a particular P.F. resin/cereal powder at 2.5 per cent. total binder addition, he produced a sand with a green-compression strength of more than 2 lb. per sq. in., which was blown successfully without any alterations to the existing tackle, and the core and castings produced were entirely satisfactory in all respects. So far, this material had not gone into large-scale production, so that it was not possible to say what real advantages there were, apart from speed of baking.

In general, he thought the problem was, as Mr. Pentz said, that most people were trying to work very economically with a high moisture content, and such mixtures were quite different in flowability and stripping qualities from oil sand. Liquid synthetic resins were adhesives and were naturally sticky. The sand tended to cling to the core-box surface, particularly where it impinged in going round corners, and the addition of a parting medium was necessary. As to baking, personal experience showed that troubles were usually encountered with cores having considerable variation in sectional thickness due to the sensitivity of U.F. resins to overbaking. Spraying of cores with a good coating of blacking before stoving helped to prevent "burning" of thin sections. The point about the actual temperature of continuous stoves was that when the core was travelling fairly rapidly through the heating zone, what mattered was the temperature attained by the core.

Fumes

MR. HARBACH, speaking on the question of sectional thickness, said it was quite usual to bake to a shallow depth. Experimental work was carried out on comparatively small cores. A point he would like to raise with Mr. Hawley was on the question of fumes from U.F. resin. In view of the Garrett Report, he would like to know whether he had reduced the fumes and was there any objectionable smell?

MR. HAWLEY said the fumes were concentrated round the core-stove; at the loading and unloading sides of the stove there was more smell than in any other part of the foundry, but he had had no complaints from operators in the vicinity of the stove. With regard to the sensitivity of U.F.-resin sands, his drying practice was the same as with oil-sands, except that the drying cycle was reduced from 100 to 80 min. Cores which were dried in three cycles when using oil-sand at 250 deg. C. to 270 deg. C. were dried in one or two cycles. When the cores completed three, four or five cycles they did not suffer from friability troubles, provided that the cores were water or plumbago-wash sprayed before drying and the moisture content was maintained at 2 per cent. or more.

MR. PENTZ said with P/F resins one could bake small cores alongside large cores provided one chose the time correctly and within reasonable limits temperature was of little significance. Even with U.F. resin it was advantageous to bake at as high a temperature as possible, because one tended to cure the resin while the moisture was still present, that was, before one had driven off too much water from the sand and this resulted in improvement in dry-strength.

Thin Sections

Regarding the problem of thin sections, it was very difficult to choose a cycle time at a high baking temperature sufficient for the large sections without overbaking thin sections. There was no complete solution with U.F. resin, but spraying of cores helped. He thought possibly the explanation of the apparent difference between Mr. Harbach's experiments and Mr. Hawley's findings was that the oil-impregnated starch previously used by Mr. Hawley required rather less heat than linseed oil. Consequently, baking conditions did not need much altering when he changed over to resin. The breakdown temperature of cereal was not very different from that of U.F. resin. In one large foundry it was normal practice to use a 2-hr. cycle at a maximum temperature of 290 deg. C. in a continuous stove similar to the one referred to by Mr. Gardom. The cores were bonded with U.F. resin and were not significantly overbaked, even on the surface. The explanation, however, was that these were large cores, weighing about 2 cwt. and were of fairly-uniform cross-section.

Design Productivity Team

To study what is being done in America in the field of industrial design is the object of a further British team which sailed on February 12, under the auspices of the Anglo-American Council on Productivity. The team of eleven will have joint leaders in Mr. R. S. Medlock, research and development engineer of George Kent, Limited, Luton, and Mr. M. Hartland Thomas, chief industrial officer of the Council of Industrial Design, and joint secretaries in Mr. J. Holland, assistant general secretary of the Association of Engineering and Shipbuilding Draughtsmen, and Mr. R. R. Ponton, standards engineer attached to the design office of Rolls-Royce, Limited. Other members of the team include Mr. G. Scholes, production engineer, David Brown Tractors (Engineering), Limited; Mr H. Smith, draughtsman in charge of development and research, and Mr. G. A. J. Witton, works manager, both of J. Stone & Company, Limited, Deptford.

The team will make a study in the engineering and allied industries of how design can be integrated with production to ensure the best utilization of available materials. It will also examine the organizations and methods adopted for securing effective co-operation between research, design, development, and engineering departments. Special attention will be paid to the simplification of procedures, reduction of scrap and the cutting of costs in relation to quality and customer requirements.

Hardening Power of Quenching Media

An evaluation of the hardening power of quenching media for steel is the subject of a voluminous Bulletin (No. 389) prepared by the Engineering Experiment Station, University of Illinois. It is in four parts:—No. 1: "Water, 9 per cent. Brine, Straight Mineral Oil, Compound Oil, and Air Under Agitated Quenching Conditions," by EARL J. ECKEL. No. II: "Brines (0 to 25 per cent. Sodium Chloride) Under Agitated Quenching Conditions," by EARL J. ECKEL and Ross M. MAYFIELD. No. III: "High-temperature Quenching Oil and Ethylene Glycol Under Agitated Quenching Conditions," by EARL J. ECKEL and GLEN W. WENSCH. No. IV: Water, Brines, and Oils Under Still Quenching Conditions," by ECKEL and ROUGH.

A foreword states that the investigation evaluates the hardening power of the common quenching media for steel by means of a simple hardenability test. The interrelationship of composition, temperature, and agitation is shown in a manner which is relatively easy for the heat treater to interpret. By measuring the cooling power of the quenchants in terms of hardness instead of cooling rates the controversies centred around adequate responsiveness of temperature recorders and the uncertainties of cooling-rate-hardness conversions are avoided.

Some of the facts revealed by the data are:—(1) The substitution of brine for water as a quenching medium does not necessarily produce a greater depth of hardening but does give a factor of safety with regard to uniform hardening. (2) There is a limit to the hardening power of quenchants; when this limit is approached, changes in the quenching conditions designed to increase the hardening power are ineffective. (3) The occasional occurrence of maximum hardness in a quenched steel part at some distance below the surface may be explained by the normal mechanism of cooling by aqueous media. (4) There is a great difference between oils and aqueous quenching media with regard to both the type and the magnitude of their response to changes in their temperature and degree of agitation.

Copies of this "Bulletin" may be obtained from the Engineering Experiment Station, University of Illinois, Urbana, Illinois, U.S.A. (Price $1.5.)

Sulphur Output and Allocation

Estimated world production of sulphur—excluding the Communist bloc of countries—will fall 20 per cent. below requirements in 1952, the International Materials Conference announced recently. At 5,825,100 long tons, the supplies of sulphur for the current year are expected to be 1,539,000 tons short of the requirements estimated at 7,364,100 tons, it was stated in a report by the Sulphur Committee of the I.M.C. when the allocations of sulphur for the first six months of 1952 were announced. The committee, on which 16 countries are represented, recalled that the sulphur shortage in 1950 and 1951 was met by reductions in stocks of producing countries, especially Italy and the United States. As no further reduction in these stocks was possible, consumption would have to adjust itself to the actual level of production this year.

The United Kingdom will receive 194,900 tons in the coming half-year, of which she may import 188,700 tons. During the last three months of 1951, the U.K. was allocated 102,300 tons. The United States was allocated 2,226,000 tons for the first six months of this year, which includes the allocation for Canada.

Steel Consumption per Head

Consumption of steel per head of the population in the United Kingdom has advanced by more than 25 per cent. as compared with pre-war consumption, but is still only half as high as in the United States of America, where it has more than doubled. To-day's British figure, in turn, is nearly twice that for France and between four and five times that for Italy.

The accompanying table, taken from the British Iron and Steel Federation's statistical bulletin for December, sets out the apparent consumption per head in the principal steel-producing countries for 1937, 1938, and 1950. The ingot equivalent of imported steel (at the current U.K. conversion rates) has been added to ingot output, and the ingot equivalent of exported steel has been deducted.

In the absence of information about changes in stocks (except in the case of the U.K.) the resulting figure of availability has been taken as equivalent to consumption. On this basis, the Table compares apparent consumption in 1937, 1938, and 1950. It also gives averages for 1937 and 1938 together, since apparent consumption in 1937 was generally higher than actual consumption, owing to a widespread building up of stocks, whereas the reverse was true of 1938.

Apparent Consumption of Steel in Ingot lb. per Head of Population.

Country.	1937.	1938.	Average 1937 and 1938.	1950.
U.S.A.	826	456	641	1,237
U.K.	550	436	493	628
Canada	410	281	346	614
Sweden	558	406	482	567
Australia	401	455	428	540
Belgium/Luxemburg ..	437	268	353	510
Germany*	537	654	596	469
Netherlands	376	290	333	370
France†	326	252	289	332
U.S.S.R.	232	235	234	309
Italy	118	127	123	137
India and Pakistan ..	8	7	7	11

* Includes the Saar in 1937 and 1938. West Germany only in 1950.
† France and the Saar in 1950.

Protecting Steel in Aluminium

Results of a series of tests made at the Fulmer Research Institute on tin-zinc alloy coatings for the protection of steel bolts used in aluminium structures are given in "Tin and its Uses," December, 1951. The protective coatings used were:—Sherardised, zinc plated, black oxide finish, cadmium, Parkerised, tin-zinc alloy coated. Unprotected steel and solid brass were included for comparison. Three bolts of each type were fixed into a piece of aluminium plate and one set of specimens was exposed for 26 weeks to each of the following corroding conditions: (1) 3 per cent. NaCl spray, daily, (2) humid SO_2 atmosphere, (3) marine atmosphere at Hayling Island, (4) industrial atmosphere at Sheffield.

The salt spray test proved more severe than the SO_2 atmosphere. In all cases the tin-zinc alloy coatings not only protected the steel bolts but gave rise to a minimum amount of corrosion of the aluminium plates and the bolts were in every case easy to remove after the tests. Zinc coatings gave the next best all-round performance and although a good deal of corrosion product was formed on the zinc, the steel was not attacked and corrosion of the aluminium was slight. The bolts were less easy to unscrew. None of the other coatings gave full protection throughout the tests and in some cases severe corrosion of the aluminium occurred and was difficult to unscrew the bolts.

Reaction of Aluminium/Magnesium Alloys with Steam

Mr. A. J. Swain, M.A., in a communication from the British Non-Ferrous Metals Research Association, printed in the Journal of the Institute of Metals, has used the following statement as an introduction to his Paper on the reactions of aluminium/magnesium alloys with steam:—

Calculations indicate that when a metal is cast into a green-sand mould, the water in the sand is almost immediately volatilized in sufficient quantity to sweep out practically all the air from the pores in the mould near the metal surface, so that the casting in effect solidifies in an atmosphere of practically 100 per cent. steam. The time for which the metal remains above the solidus temperature is likely to be of the order of 10 min. for a casting about 2 in. thick in an aluminium alloy of wide freezing range, and correspondingly longer for a larger casting.[1] When the metal contains a readily-oxidized element, the latter may react with the steam during solidification to form oxide and hydrogen. This reaction, commonly known as metal/mould reaction, is prevalent in sand castings of aluminium/10 per cent. magnesium alloy, and the work described in the present Paper is part of an investigation on metal/mould reaction in this alloy.

"Internal" and "External" Hydrogen

It is convenient to distinguish between "internal" hydrogen, which is absorbed by the metal and may give rise to porosity or disruption, and "external" hydrogen, which is released to the atmosphere. For an aluminium/7 per cent. magnesium[2] alloy reacting with water vapour at 16 mm. pressure at approximately 600 deg. C., between the solidus and liquidus temperatures, the external hydrogen was much the greater, representing about 98 per cent. of the total hydrogen formed in the reaction. Thûs the external hydrogen, although not so important in some respects as the internal hydrogen, is a convenient approximate measure of the total extent of the reaction. In these experiments, therefore, various alloys have been allowed to react with pure steam at temperatures between 450 and 700 deg. C., and the external hydrogen collected and measured during the first 15 min.

Alloys with 1 to 25 per cent. magnesium have been studied. Although alloys containing more than 10 per cent. magnesium are not normally used in casting, they have been included to investigate the effect of magnesium enrichment of the liquid phase in partially molten alloys. The use of small additions of beryllium to inhibit metal/mould reaction has been suggested, and preliminary experiments on such alloys have been carried out.

Conclusions

As the result of a large amount of experimental work, the Author has reached the following conclusions:—

The reaction between aluminium/magnesium alloys and steam, as measured by the external hydrogen formed under the conditions of these experiments, reaches a maximum rate at a temperature dependent on the composition of the alloy, but within the range 550 to 625 deg. C. For the 10 per cent. magnesium alloy, which is widely used as a casting alloy, this maximum reaction rate occurs at a temperature within the solidus/liquidus range. This probably accounts for the fact that gas porosity caused by metal/mould reaction in sand castings of this alloy occurs mainly in the surface layers of the castings. No satisfactory explanation of these effects can be advanced at present.

(*Continued at the foot of col.* 2)

[1] R. W. Ruddle, *J. Inst. Metals*, 1950, **77**, 1.
[2] R. Eborall and C. E. Ransley, *J. Inst. Metals*, 1945, **71**, 525.

New German Blast-furnace

A new 23 ft. hearth blast-furnace designed for a coke consumption of 1,000 tons per day recently built by Demag for Hüttenwerk Hoerde, at Mulheim-Ruhr, and which has just completed its first year of production, has a number of interesting features. In addition to hearth and bosh, the lower third of the shaft is jacketed with a steel shell, the remaining top section of the shaft being hooped to give the necessary strength. A separate furnace frame built around the furnace supports the top structure and hoist bridge. At the level of the shaft lintel girder the furnace frame is provided with brackets on which the furnace rests. The shaft brickwork is cooled by 840 open cooling boxes built into the shaft wall in checkerboard arrangement, while the lower portion of the furnace is spray-cooled. The shaft lining consists of 750 mm. of fire bricks, while the hearth wall is 1 m. thick. Carbon ramming is used for bottom, hearth and bosh.

Hematite-iron Segment Plates

As a means to preserve the upper lines of furnace brickwork from excessive wear at the points where stock being charged strikes the brickwork, a protective shell built up of hematite cast-iron segment plates is provided, and to compensate for furnace expansion a flexible member is formed between top shell and furnace shaft by means of a sand seal. The furnace has 12 tuyeres 180 mm. dia. An iron notch, and three slag notches are provided.

The hot-blast stoves operate with waste-gas circulation. This arrangement was originally made to permit the dome temperature to be maintained at a predetermined maximum value, without adding any surplus air, by automatically varying the volume of waste gas in circulation. The operating results obtained with this system showed, however, that this method offers still other advantages, namely an increase in the rate of heat transfer within the checkers due to the higher gas velocity during the heating phase, and, in consequence of this, a decrease of waste-gas temperatures. Along with a certain heat recovery from the recirculation of hot waste gases in place of the cold cooling air, the method results in a corresponding increase of the entire blast heating efficiency of the stoves.

Personal

CHAMBERLAIN INDUSTRIES, LIMITED, of Staffa Road, Leyton, London, E.10, have appointed MR. L. B. SMITH as manager of their building division.

THE UNITED STEEL COMPANIES, LIMITED, announce that Mr. E. E. Ingleton has been appointed works manager of Yorkshire Engine Company, Limited, Sheffield.

MR. HAROLD T. LUKE has been appointed manager of the branch service depot at Strathkinness (Fife) of James H. Steele, Limited, agricultural engineers, of Edinburgh.

UNTIL recently deputy general works manager of Hoover, Limited, MR. B. H. DYSON has been appointed general works manager for the company's four main factories.

MR. RONALD WILLIAM GOURDIE has been appointed secretary of Acrow (Engineers), Limited, London, S.W.1., in place of MR. F. V. S. BARTLETT, who has retired.

AFTER 56 years' service with the company, MR. THOMAS HUTTON has retired from the position of foreman engineer of S. P. Austin & Son, Limited, the Sunderland shipbuilders. Mr. Hutton is 70 years of age.

DR. J. B. MAVOR, chairman of Mavor & Coulson, Limited, mining machinery manufacturers, of Glasgow, has been elected president for the ensuing year of the Glasgow and West of Scotland section of the Institute of Industrial Supervisors.

THE APPOINTMENT is announced by the United Steel Companies, Limited, of MR. C. E. EDWARDS as a director of the Appleby-Frodingham Steel Company. Mr. Edwards has been commercial manager of the Appleby-Frodingham branch since January 1, 1950. He previously held the position of sales manager.

MANAGING DIRECTOR of Sir James Laing & Sons, Limited, Sunderland, MR. ALLAN J. MARR has been elected a shipbuilders' representative on the River Wear Commission in succession to the late Mr. F. W. Dugdale. MR. HENRY HUNTER, a director of the North Eastern Marine Enginering Company (1938), Limited, has succeeded his brother, SIR SUMMERS HUNTER, as engine builders' representative on the authority.

MR. F. C. GRAY has been appointed manager of Metropolitan-Vickers Electrical Export Company, Limited, for Spain. Starting as a college apprentice at Metropolitan-Vickers in 1938, Mr. Gray joined the general engineering department of the company as a junior engineer in the power and general section in 1947, transferring to the export company in the following year. In 1949 he left M-V to take up an executive position with Gilkes (Gilbert) & Gordon, Limited, turbine and pump makers, of Kendal (Westmorland), where he remained until the end of last year.

UNTIL THE FUTURE of steel supplies is ascertained, there will be no new carriage building at the Doncaster works of British Railways. Enough steel is on hand to complete carriage and wagon repairs already started.

MINERAL PRODUCTION of Northern Rhodesia last year was valued at just under £50,000,000, compared with £35,500,000 in 1949. The increase was due to increased output and average values of cobalt and copper and to higher average prices for lead and zinc; the production of gold, silver, and selenium showed a substantial increase in both quality and quantity, while beryl was produced for the first time. Copper accounted for £43,000,000 of the total production.

Ceylon to Establish Iron and Steel Works

The Director of Industries at Colombo has issued a call for tenders for the establishment of iron and steel works at Enderamulla, about seven miles from Colombo.

An initial output of 5,000 to 7,000 tons of pig-iron a year is contemplated, to be expanded later to between 18,000 and 25,000 tons. Steel-melting plant to produce annually 20,000 tons of ingots, working mainly on scrap, is called for, and there are to be the necessary reheating units and roughing and finishing mills.

Tenders will be considered for individual items such as pig-iron plant, melting furnaces, and rolling mills, but the Government of Ceylon would prefer tenders for the entire project, complete with buildings and civil engineering works.

Closing date for tenders is March 28. Copies of the specifications and conditions are obtainable on application to the Commercial Relations and Exports Department of the Board of Trade, Horse Guards Avenue, London, S.W.1 (Room 7177).

Scottish Pig-iron Production

Among measures planned to increase pig-iron production in Scotland, and thereby offset the shortage of steelworks' scrap, are the modernization of the blast-furnace ancillary plant at the Gartsherrie Works of Bairds & Scottish Steel, Limited, and the construction of a fourth blast furnace at the Clyde Ironworks, Tollcross, of Colvilles, Limited. The measures were outlined in a letter from the Minister of Supply, Mr. Duncan Sandys, to the general council of the Scottish Trades Union Congress, which had asked him to expedite the construction of blast furnaces and the provision of coke-oven capacity at Scottish iron and steel plants.

Mr. Sandys stated that it would be necessary to ensure that ample supplies of coking coal were available and that the docks were equipped to handle larger tonnages of imported ore.

Dust Precipitation

In the course of his conclusions in a Paper on "Dust Precipitation" read by Mr. G. C. Goodwin before a meeting of the Manchester Association of Engineers on January 25, the author points out that the cost of dust elimination rises very steeply as the efficiency of collection is increased and, in order that one particular section of the community should not be unfairly burdened by restrictions, it would seem that some central or national body should be given the powers to specify the degree of elimination which is necessary, the grading of the dust which may be allowed to escape and the methods and means to be adopted to demonstrate that the desired results have been attained. The work of such a body, states the author, would not be easy, since much work would have to be done to obtain additional information on variations in dust grading and concentration with different types of boilers and methods of firing. It is also obvious that an emission, which could be considered as reasonably good in a highly industrialized area, might constitute a definite nuisance in, say, a residential or country district; but to be just, the findings should apply to all chimneys and industrial processes which at present, or in the future, discharge solid matter into the atmosphere.

New Catalogues

Crushing and Grinding Machines. A series of five catalogues, uniform in presentation, has just been issued by Sturtevant Engineering Company, Limited, Southern House, Cannon Street, London, E.C.4. The titles they carry indicate their scope. They are Ring Roll Mills; Swing Sledge Mills and Hinged Hammer Pulverisers; Roll Jaw Crushers; Batch Mixers and Blenders, and Rotary Fine Crushers. They are well illustrated and attractively laid out. They are available to our readers interested in this class of plant from Southern House.

Corebinders. Wm. Aske & Company, Limited, Victoria Works, Waterside, Halifax, have produced a 12-page booklet illustrated with lovely ladies in the scantiest of clothing. It is not quite the type of publicity which has the reviewer's full approbation, as the appearance of these diaphanously-clothed young women is such as to detract the attention from the text, which is the more important aspect. However, in these dull days, the appearance of this exceptionally "bright" little catalogue on buyers' desks will cause a good deal of fun and much discussion. This naughty little publication is available to our readers on application to the Victoria Works. There now! the appearance of so many young ladies caused us to forget that it deals with the Baltiseed range of products.

Core-shop Plant and Supplies. The Fordath Engineering Company, Limited, Hamblet Works, West Bromwich, have sent us an eight-page catalogue which lists a bewildering range of core-sand binders, culminating in the Glyso-Resyn core-powders for baking by short period stoving, or dielectric baking. This recent development is given, as it well merits, a special "Instruction Leaflet." This sets out in tabular form the characteristics of the mixtures currently used and gives much other interesting data. The reviewer was not pleased to see the fahrenheit scale being referred to. There was also enclosed "Mr. Fettlewell was *so* surprised," a four-page leaflet setting out a light approach to a serious development. This catalogue and the leaflets are available to our readers on writing to Hamblet Works and those interested in core-shop developments should not fail to secure their copies.

Thermo-electric Pyrometers. The reviewer is very appreciative of the manner in which the makers of scientific instruments compile their catalogues, for most of them go to quite an amount of trouble to expound the background information necessary to appreciate their line of goods. A good example is "Resilia Book No. 103," just issued by the Foster Instrument Company, Limited, of Letchworth, Herts, for therein is printed about ten pages of well-written "introduction" before getting down to the apparatus they manufacture and the services they accord to users. On pages 27 to 29 there is described and illustrated a line of pyrometers which are really thermocouples for foundry use. Three applications are covered: for use in connection with ascertaining the temperature of molten aluminium; brass, gunmetal, and so on; and a third for cast iron and the like. This 66-page, well-illustrated catalogue is full of interest and is available to our readers on writing to Letchworth.

Institute of Metals: May Lecture.—The 1952 May Lecture to the Institute of Metals will be delivered by Dr. J. J. P. Staudinger, on "The Place of Plastics in the Order of Matter." The meeting will be held in the lecture theatre of the Royal Institution, Albemarle Street, London, W.1, on Monday, March 24, at 6 p.m. Visitors will be welcomed and tickets will not be required.

Two Fatal Accidents

Electrical Fault Blamed

A Walsall firm of casting manufacturers, Platt Malleable Castings, Limited, of Hatherton Lane, Leamore, was recently fined £25 at Walsall for not taking adequate precautions to prevent a moulding machine from becoming charged with electricity, in consequence of which a workman was killed.

Mr. P. E. Knowles, prosecuting, said that on September 10 last, Leonard Lippitt (20) was operating the machine. It was usual for operators to sit on the handle of the machine to get the maximum pressure. When Lippitt sat on the lever he was heard to moan, and another workman switched off the current.

For the firm, who pleaded guilty, Mr. E. H. Kenshole said that no sure explanation could be found for the accident. An electrician examined the machine the following day and apparently Lippitt had broken a cable when using a shovel to fill sand into the machine. Electricity was no longer used on these machines as they had since been converted to pneumatic power.

Hoist Failure

An accident at the Horsehay Engineering Works on January 17, when William Henry Jones (64) of Lawley Bank was killed, was described at an inquest on January 24. It was stated that Jones was using an electric hoist to lift a 25-cwt. casting, when the metal fell out of the lifting chains and crushed Jones.

Mr. J. C. Westbrook, in charge of the shop, said the hoist was designed to lift two tons and was in good order. Jones was an experienced workman. It appeared that the casting had not been fastened with chains in the normal manner. In his 35 years' experience he had never seen a similar accident. A verdict of "accidental death" was returned.

Commonwealth Scientific Conference. Sir Ben Lockspeiser, K.C.B., F.R.S., secretary of the Department of Scientific and Industrial Research, left for Australia on February 1 to lead the United Kingdom delegation to the British Commonwealth Scientific Conference. With him were Sir William Slater, K.B.E., secretary of the Agricultural Research Council, Dr. F. H. K. Green, representing the Medical Research Council, and Dr. Alexander King, head of the Intelligence Division of the Department of Scientific and Industrial Research. All the self-governing countries of the Commonwealth were represented by delegations, and colonial research was represented by Dr. G. A. C. Herklots, of the Colonial Office. The United States Government is also sending observers. The main object of the conference is to further collaboration in research throughout the British Commonwealth. The Conference will be opened by the Prime Minister of Australia in Canberra on February 18. After a few days the delegates will travel by road to Melbourne, where the Conference will resume until March 9.

SPEAKING at the annual dinner of the Birmingham, Coventry and West Midlands branch of the Institute of British Foundrymen in Birmingham, on January 25, Mr. J. Wilson, principal of the Birmingham College of Technology, deplored the attitude of people, especially parents, who thought that the foundry industry was "not quite respectable enough" and that it offered only restricted educational careers. Mr. Wilson went on to say that the new premises of the Birmingham College of Technology, now being built in Corporation Street, will be "a living part" of the foundry industry. Mr. T. R. Twigger, branch president, said that, in his opinion, more technical education and applied science should be introduced into industry.

Obituary

WATER and steam engineer of Stewarts and Lloyds, Limited, at Corby (Northants), MR. ERNEST MICHAEL FITZCHARLES died recently. He was 63.

MR. ALBERT EDWARD CLARKE, who died recently, was works superintendent of Henry Hope & Sons, Limited, metal window manufacturers, of Smethwick (Staffs). He was 66.

THE DEATH has taken place of MR. NORMAN FITZ HARDING, founder and chairman of Harding & Harding, Limited, structural engineers of Belfast. He was also a director of the Ulster Tin Company, Limited.

MR. WALTER M. DONALD, a director of the Atlas Steel Foundry, Armadale, died suddenly on February 7 at Troon, at the age of 74. He was a former Provost of the town. At the age of 18 he went to South Africa, where he was associated with Cecil Rhodes in the extension of the railway to Bulawayo.

THE DEATH is reported of MR. FRANCIS ROWNTREE, who was living in retirement at Whitley Bay. An authority on Diesel engines, Mr. Rowntree retired from the Diesel department of Swan, Hunter & Wigham Richardson, Limited, after having served the firm for more than 45 years. He was 68.

THE DEATH has occurred of MR. JAMES EDWARD FOWLER, for many years associated with the metals division of the Imperial Chemical Industries, Limited. Mr. Fowler, who was 87, was a well-known figure in the industrial life of the Midlands and had served as chairman of several trade associations in the non-ferrous metal industry.

WIDESPREAD REGRET in Midland foundry trade circles has been caused by the sudden death of MR. J. H. RABY at the age of 62. For over 30 years, "Jack" Raby had been manager of the large aluminium sand foundry of the Birmingham Aluminium Casting (1903) Company, Limited, and he did much during those years to develop techniques of sand castings. He was one of the original group of Birmid foundrymen who have assisted in building up that well-known combine's prosperity.

MR. T. A. M. ROBERTS, sales director of I.C.I., Limited, Metals Division, died at his home near Birmingham on February 3, at the age of 51. He joined I.C.I. Metals Division in 1916, when he took up an appointment with Elliott's Metal Company, Limited, and in 1928 he moved to the Witton headquarters, becoming metal sales-manager in 1932 and joining the Metals Division Board in 1945. Mr. Roberts was widely known in metallurgical circles, being chairman of the Brass and Copper Tube Association and the Extruded Brass and Copper Alloys Association. He was also a member of the Executive Committee of the Cold Rolled Brass and Copper Association and of the Advisory Committee of the High Conductivity Copper Association.

A SPECIAL DIRECTOR of William Beardmore & Company, Limited, Parkhead Steel Works, Glasgow, since November, 1949, MR. ANDREW S. JOHNSTON died on January 28 at the age of 58. He entered the employment of the company in 1911; he was then 18 years of age. Mr. Johnston served successively in the cost, forge, and secretarial departments and, in September, 1931, he was appointed assistant secretary of the company. He was a director and/or secretary of certain subsidiary companies. Early in 1940, he became personal assistant to Sir James Lithgow, who was Controller of Merchant Shipbuilding and Repair during the second world war. On June 1, 1945, Mr. Johnston returned to the service of William Beardmore & Company, being appointed sales manager. He retained this position on being appointed a special director.

Recent Wills

DALE, G. H., iron and steel merchant, of Withington, Manchester £1,843

GREENWOOD, B. P., a director of Vulcan Foundry, Limited, Newton-le-Willows (Lancs) £31,906

BARRATT, J. I., vice-chairman of R. J. Richardson & Sons, engineers' agents, of Birmingham £14,501

SHARP, J. T., managing director of Garfitts, Limited, manufacturers of lawn-mowers, and lawn-mower and agricultural fittings, of Sheffield £7,051

SKELTON, S. R., a departmental manager of Edgar Allen & Company, Limited, the Sheffield steel-makers, with which company he had served for 49 years £3,070

CHELIOTI, G. C., a director of the General Electric Company, Limited, and its associated and subsidiary companies, and a member of council of the Engineering and Allied Employers' National Federation £25,301

THOMPSON, SIR ROBERT N., chairman of Joseph L. Thompson & Sons, Limited, shipbuilders, of Sunderland, and a director of John Crown & Sons, Limited, the Sunderland Forge & Engineering Company, Limited, and Sir James Laing & Sons, Limited £73,819

JOHNSON, SIR ROBERT S., chairman and former managing director of Cammell Laird & Company, Limited, Birkenhead, and a director of other companies, including the English Steel Corporation, Limited, Metropolitan-Cammell Carriage & Wagon Company, Limited, and Patent Shaft & Axletree Company Limited £154,107

MENSFORTH, SIR HOLBERRY, late general manager of Metropolitan Vickers Electrical Company, Limited, a former director of John Brown & Company, Limited, Dorman, Long & Company, Limited, Thos. Firth & John Brown, Limited, Tredegar Iron & Coal Company, Limited, and many other companies, and first Director-General of Factories, War Office, 1920-26 ... ... £6,207

MACLAREN, J. E., late managing director of B.S.A. Tools, Limited, the Cardiff Foundry & Engineering Company (1947), Limited, B.G. Machinery, Limited, the Index Automatic Machine Company, Limited, and other companies, who took a leading part in the transfer to Redditch of the machine-tool factory of the Index Werke, Esslingen, under German war reparations £26,197

Productivity in 1951

According to the interim index prepared by the Central Statistical Office, industrial production in the United Kingdom in 1951 rose by 3 per cent. above the 1950 level. The target set by the Government's Economic Survey for 1951 was an increase of 4 per cent.

Estimates of output and provisions for the impact of rearmament made in the survey were based on the assumption of a 4 per cent. increase in productivity over the whole of last year. This assumption was, however, qualified by the warning that the raw materials required for this increase could not be counted on. Productivity had been rising by an average of 7 per cent. a year, reaching 8¼ per cent. in the record year of 1950, just before the defence programmes began to make heavy inroads into raw material supplies.

Franco-Italian Trade Pact

Under a new trade agreement between France and Italy, the French authorities have undertaken to export to Italy a number of scarce materials during 1952. The principal quotas (with quantities in tons) are:—Clays and refractory earths, 70,000; natural phosphates, 900,000; iron ore, 400,000; coal, 600,000; firewood, 45,000; cast iron, 25,000; iron and steel scrap, 65,000; old iron, 25,000; old railway material, 20,000; second-grade iron and steel products, 20,000; iron and steel semi-manufactures, 15,000; finished iron and steel products, 50,000; fine and special steels, 7,000.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference CRE (B) can be obtained from the Commercial Relations and Exports Department (Industries Branch), Board of Trade, Thames House North, Millbank, London, S.W.1 (room or telephone number stated).

ALTRINCHAM, February 23—Manhole covers and frames and gully grates and frames, for the Borough Council. The Borough Surveyor, Town Hall, Altrincham.

ATHERTON, February 16—Gullies and manhole covers, for the Urban District Council. The Surveyor, Town Hall, Atherton.

BARNSLEY, February 18—Cast-iron manhole covers and gully gratings, for the Borough Council. The Borough Engineer and Surveyor, Town Hall, Barnsley.

BRIERLEY HILL, February 25—Cast-iron manhole covers and gully grates, for the Urban District Council. The Engineer and Surveyor, Hawbush House, Brierley Hill.

CHESTER, February 16—Ironwork, for the Cheshire County Council. The County Surveyor, Backford Hall, near Chester.

DEWSBURY, March 6—Cast-iron pipes and specials, valves, hydrants, water meters, surface boxes, etc., for the Borough Council. The Water Engineer, 10, Church Street, Dewsbury.

DUBLIN, February 20—Cable bar iron, foundry requisites, volute springs, steel tyres, spring steel, steel blooms, steel plates, sheets, bars, angles, steel plates for locomotive boilers, high-speed twist drills, copper plates, and rods, etc., for the City Council. The Stores Superintendent, Inchicore, Dublin.

FELLING, February 16—Cast-iron work, for the Urban District Council. Mr. J. Donkin, clerk, Council Buildings, Felling.

GODALMING, February 16—Supplying and laying 694 yds. of 3 in., 4 in., and 6 in. spun-iron water mains, for the Borough Council. Mr. C. B. Spivey, water engineer, Branksome, Filmer Grove, Nightingale Road, Godalming. (Deposit, £2 2s).

HUYTON-WITH-ROBY, March 1—Manhole and gully covers, frames, step-irons, bolts, screws, nails, etc., for the Urban District Council. The Engineer and Surveyor, Council Offices, Derby Road, Huyton.

JOHANNESBURG, February 21—Narrow gauge wheels and axles, for the South African Railways. Room 6172 (CRE/2891/52).

KING'S LYNN, February 18—Gully gratings, manhole covers, etc., for the Borough Council. Mr. H. G. Ridler, borough engineer, 27, Queen Street, King's Lynn.

LANCASTER, February 22—Manhole covers, gully gratings, iron castings, etc., for the County Council. The City Engineer, Town Hall, Lancaster.

LEEDS, February 18—Sewer ironwork, for the City Council. The City Engineer, Civic Hall, Leeds, 1.

LINCOLN, February 20—Cast-iron and prefabricated steel manhole covers and gully gratings, for the City Council. The City Engineer and Surveyor, Silver Street, Lincoln.

LONDON, S.E, February 27—Supply and installation of 30-ton weighbridge, etc., for the Deptford Borough Council. The Borough Engineer and Surveyor, Deptford Town Hall, London, S.E.14.

MACCLESFIELD, March 1—Iron castings, for the Borough Council. Mr. J. H. Dossett, borough engineer, Town Hall, Macclesfield.

NORTON, February 16—Supplying and laying about 1,680 yd. of 8 in., 6 in., and 4 in. spun-iron water mains, valves, etc., for the Urban District Council. Fairbank & Son, consulting engineers, Barclay's Bank Chambers, St. Helen's Square, York. (Deposit, £2 2s.)

NORWICH, February 18—Manhole covers and frames, for the City Council. Mr H. C. Rowley, city engineer, City Hall, Norwich.

OSWALDTWISTLE, February 18—Cast-iron pipes and special castings, stop taps and ferrules, brass fittings, etc., for the Urban District Council. The Surveyor, Town Hall, Oswaldtwistle.

RUTHIN, February 25—Road grids and frames, manhole covers, etc., for the County Council. Mr. W. E. Thorp, county surveyor, 46, Clwyd Street, Ruthin.

SALE, February 20—Manhole covers and other ironwork, for the Town Council. The Borough Engineer, Town Hall, Sale.

SALFORD, February 18—Iron castings, for the City Council. The City Engineer, Town Hall, Salford, 3.

SUNDERLAND, February 18—Gullies, manhole covers, step-irons, etc., for the Borough Council. The Borough Engineer, Athenæum Buildings, Fawcett Street, Sunderland.

TYNEMOUTH, February 25—Cast-iron work, cable, etc., for the Borough Council. Mr. D. M. O'Herlihy, borough surveyor, 16, Northumberland Square, North Shields.

WORTLEY, February 21—Iron castings, for the Rural District Council. Mr. H. Hague, acting engineer and surveyor, Council Offices, Grenoside, Sheffield.

YEOVIL, February 21—Provision and laying of 600 yds. of 9 in. cast-iron sewers, etc., for the Rural District Council. Mr. C. A. Wilson, surveyor, 26, Kingston, Yeovil. (Deposit, £2 2s).

Board Changes

DARWINS, LIMITED—Mr. Hugh Quennell has been elected to the board.

SUPERHEATER COMPANY, LIMITED—Mr. K. E. Merefield has been appointed a special director.

BEARPARK COAL & COKE COMPANY, LIMITED—Mr. Samuel G. Coulson has been elected a director.

W. & J. GLOSSOP, LIMITED—Mr. F. W. Elston and Mr. Victor Jones have been appointed directors.

STANCROFT, LIMITED—Mrs. Dorcas Croft has been appointed chairman and managing director in succession to the late Mr. Stanley Croft.

JOHN DALE, LIMITED—Mr. W. E. H. Jones has been appointed managing director in place of Mr. Ralph E. Carr, who has resigned from that position. Mr. Ralph E. Carr is retaining his seat on the board. Mr. L. R. Carr has been appointed deputy chairman.

BRISTOL AEROPLANE COMPANY, LIMITED—Sir G. Stanley White, managing director, has relinquished that position and has been appointed deputy chairman. Mr. W. R. Verdon Smith and Mr. George S. M. White, hitherto assistant managing directors, have been appointed managing directors.

Big Wage Increases in 1951

The increase of 10½ per cent. in weekly wage rates during 1951 was the biggest annual increase since the index was started in 1947. During last year it is estimated that 12,500,000 workers received increases amounting to more than £6,500,000 a week.

At the end of the year the index stood at 126, compared with 114 in 1950, 109 in 1949, and 107 in 1948. Last year's increase of 10½ per cent. thus compares with 4 per cent. in 1950, 1½ or 2 per cent. in 1949, 4 per cent. in 1948, and 5 per cent. in 1947.

Work stoppages arising from industrial disputes caused nearly 1,700,000 working days to be lost at establishments where the stoppages occurred. The figure was about a fifth larger than that for 1950, and the 380,000 workers involved were a quarter more than in 1950. They represented about 1½ per cent. of the total in civil employment.

New Incentive Required

Speaking at the annual dinner of the local branch of the Foremen and Staff Mutual Benefit Society at South Shields, Mr. W. M. Patterson, chairman of C. W. Taylor & Son, ironfounders, South Shields, told foremen from South Shields, Jarrow and Hebburn district that some real and tangible methods of encouragement must be found for workers to turn out more goods. The present system of incentive by wage increases, which only led to equal rises in the cost of living, he described as old-fashioned.

Mr. Patterson, giving his views on what was needed to put Britain back on a sound economic footing, said hard work was needed from all, and there must be no hesitation in turning down old systems. He urged minimum rates of wages and upward grading for higher skilled men and the development of co-partnership schemes. It was the duty of everyone to work harder for some time to come, he added.

NATIONAL OIL ENGINES (EXPORT), LIMITED, has been registered as a private company with a capital of £50,000 in £1 shares to undertake the export business of the National Gas & Oil Engine Company, Limited.

News in Brief

CARMUIRS IRON COMPANY, LIMITED, Falkirk, are to make extensions to the existing moulding shop at an estimated cost of £6,000.

THE PLASTICS industry will be represented by a productivity team visiting America under the auspices of the Anglo-American Council on Productivity which sailed on February 12 in the Queen Elizabeth.

IN VIEW of the ever-increasing use of photography and the new and valuable information which is constantly being made available, Kodak, Limited, is now publishing a new edition of the "Kodak" Data Book.

AT A MEETING of the Chesterfield and District Foremen's Association, Mr. M. C. Cooper, of the Hoffman Manufacturing Company, Limited, Chelmsford, spoke on "The Manufacture of Ball and Roller Bearings."

ALUMINIUM BRONZE CASTING COMPANY (BALHAM), LIMITED, have taken over Non-Ferrous Founders, Limited, Garth Road, Lower Morden, Surrey. The transfer dates from January 31; no change in name is envisaged.

OWING to the cut in steel, and shortage of certain components in graded steel used on coaches and wagons, about 100 employees have been dismissed, or found alternative work, at the British Railways' Carriage and Wagon works, Derby.

A LARGE SMETHWICK FIRM — the Birmingham Aluminium Casting Company, Limited, part of the Birmid combine which, *inter alia*, makes jet-engine parts, has plant standing idle and cannot use increased productive capacity because they are unable to obtain 50 skilled moulders.

ELECTRICALS, LIMITED, Newcastle-upon-Tyne, has been appointed technical representatives of Clarke, Chapman & Company, Limited, Gateshead, for the sale of its mining equipment in the Northern (N & C), Durham, North-Western, and West Midlands Divisions of the National Coal Board.

MARSHALLING AND QUEUEING is the subject of this year's annual open meeting held by the Operational Research Club under the chairmanship of Sir Charles Goodeve. It will be on March 17 at 2.30 p.m. at the rooms of the Royal Society, London, and admission is free to non-members on application to the secretary, 14, Sheen Gate Gardens, S.W.14.

NEW EQUIPMENT installed at the Brierley Hill works of Richard Thomas & Baldwins, Limited, includes six vertical cylindrical bell-furnaces supplied by the General Electric Company, Limited. They are capable of annealing up to 700 tons of coiled silicon steel strip per week. Each furnace, which weighs 15 tons and has a full complement of bases and hoods, is required to handle charges up to 20 tons.

IN JUST OVER 100 YEARS of existence the Singer Sewing Machine Company, Limited, have produced 3,600 different styles of machine, representing the production of a new style every ten days. Mr. W. E. Grist, a director of the company, says that the catalogue listing their total variety of products actually weighed more than one of their modern portable electric sewing machines. Sales throughout the world last year amounted to 1,250,000 machine.

A CONTRACT for the instrumentation of a large coke-oven plant at St. Louis, Missouri, U.S.A. has been secured by the Bristol's Instrument Company, of Weymouth. The ovens are being built by another British firm, Simon Carves, Limited. Both firms secured the contracts in the face of the keenest American competition. The instrument control panel is 20 ft. long and 7 ft. high, and incorporates instruments to measure, record and automatically control pressures, temperatures, and rate of flow.

COL. HAROLD B. SANKEY, director of Guest, Keen & Nettlefolds Limited, and chairman and managing director of Joseph Sankey & Sons Limited, has been appointed president of the Birmingham, Wolverhampton & Stafford District Engineering and Allied Employers Association in succession to Mr. G. H. Savage. Mr. W. F. Brazener, one of the leaders of the Non-ferrous Metals Productivity Team which visited America, has been appointed deputy president. He is managing director of The Mint, Birmingham.

THE POSSIBILITY of establishing a steel industry in Western Australia is to be examined. There are large deposits of iron ore in Western Australia, but the establishment of a steel industry has been held back because of the unsuitability of local coal for coking purposes. At present iron ore is mined on a big scale at Yampi Sound, on the north-west coast, and shipped to the eastern States. The Western Australian Minister for Industrial Development says that an Australian company has offered to establish a steel industry in the State on a limited scale without Government backing. Another company which is interested in the project would require Government support.

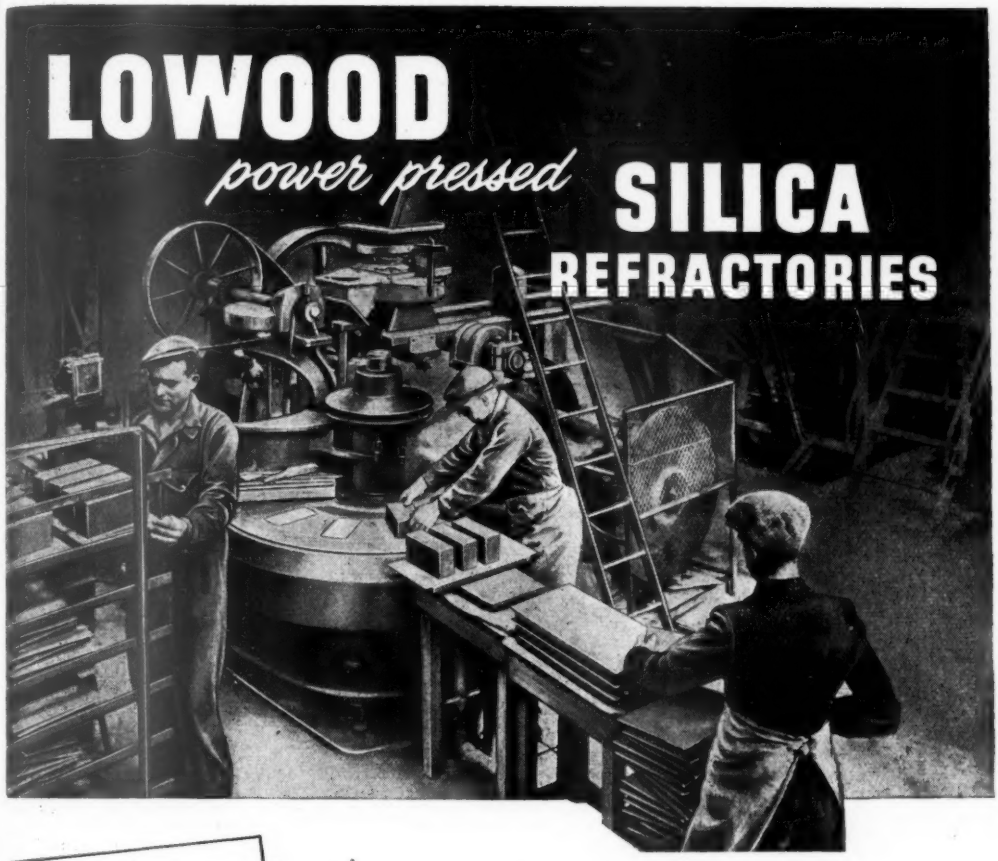
LORD BURGHLEY, chairman of Birmid Industries, Limited, is to speak on "Some Experiences in Administration" on March 5 to the Industrial Administration Group of the Birmingham branch of the Institute of Industrial Administration. The Group has arranged an interesting and stimulating programme for the Spring. The Anglo-American Productivity Team on administration is to pay a visit on March 27 and the annual dinner is fixed for April 4. Meetings are under the chairmanship of Mr. Frank G. Woollard, of the Birmingham Aluminium Casting (1903), Limited, who has done so much to develop the activities of the Birmingham branch, bringing to its meetings many leading industrialists and technical experts.

AT THE ANNUAL DINNER of the Midland branch of the Institution of Mechanical Engineers in Birmingham on January 31, at which Professor G. F. Mucklow presided, Sir Wilfred Martineau, chairman of the Birmingham Education Committee, suggested that professional bodies should correlate their requirements for higher education thus easing the problems of preparing curricula for technical colleges. He said that while every professional institution should be able fully to express its requirements for the final examination, he thought preliminary and intermediate examinations could profitably be brought more into a combined assimilation. He felt it would make life much easier for the technical colleges.

ACCLES & POLLOCK, Oldbury, celebrated its 50th anniversary on February 1, and many members of this well-known Midland firm's history were revived. It was on February 1, 1902, that 20 workers took over dilapidated premises in Churchbridge and began the structure of the present firm. In 1909 two acres of land on the canal side at Oldbury were purchased, and that was the inception of the present Paddock Works. Later a further 19 acres was acquired and extended factory buildings erected. The only survivors of that first historic group of employees are Mr. Walter Hackett who, beginning work on the shop floor, rose to become chief executive; Mr. Jack James who still works part-time, and Mr. Frank Tuckey who is retired. In spite of the steel shortage the firm continues to add to the volume of its orders.

LOWOOD

power pressed **SILICA REFRACTORIES**



EFFICIENT RAW MATERIAL SELECTION AND PREPARATION

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PERFECT GRADING CONTROL

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INCREASED SILICA CONTENT

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PERFECT ACCURACY IN SHAPE AND SIZE

Developed to withstand the most severe operating conditions, Lowood Silica Refractories satisfy the demand for higher density, lower porosity, greater purity, lower rate of wear and, consequently, longer life and reduced maintenance costs. Lowood Silica Refractories are used extensively in open-hearth furnaces, electric furnaces, converters, glass furnaces, etc.

Full particulars and test data will be supplied on request.

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Raw Material Markets

Iron and Steel

Outputs of pig-iron from the furnaces now in blast are well sustained, but tonnages available for distribution remain much below the needs of both the steelworks and the foundries. Deliveries of home and foreign ores continue to reach the furnaces on an improved scale, and the higher-grade ores which are coming to hand from oversea should result in increased outputs of pig-iron on account of the higher percentage of iron content. Unfortunately, production from some furnaces is still adversely affected by insufficient supplies of coke, current deliveries being barely sufficient for day-to-day needs, while the quality of some consignments is below the standard required to ensure maximum outputs of pig-iron.

In the absence of sufficient supplies of scrap, the steelworks are clamouring for increased deliveries of pig-iron, and, with imports much below requirements, heavier demands are made on home producers. These requirements can only be met partially, and even to accomplish this entails either a reduction in supplies or delay in deliveries to the foundries.

The demand for pig-iron from all foundries is urgent, with particular stress on the grades required by the engineering and speciality foundries—low- and medium-phosphorus iron and hematite, as well as refined iron. The light and jobbing foundries are able to utilize all the high-phosphorus iron they can secure. Consumers' stocks are practically non-existent, most foundries working on a day-to-day basis of deliveries of both pig-iron and scrap, supplies of the latter being very stringent, particularly heavy cast-iron scrap.

Foundry coke is coming forward regularly, but tonnages are not sufficient to augment stocks. In fact, many foundries are short of supplies and are relying entirely on current deliveries, which, if delayed, interfere with production. Ganister. limestone, and firebricks can be obtained to requirements, but some ferro-alloys are difficult to secure.

The re-rollers are badly behind in deliveries of their products of small sections, bars, and strip, present allocations of steel being inadequate. Home steelworks are sending forward all the steel semis they can spare, but they are unable to keep their own mills fully occupied with available supplies and cannot, therefore, step up deliveries to the re-rollers. Some improvement in deliveries from the Continent has eased the position slightly. It is hoped that the agreement with America and the purchases from Japan will eventually enable increased supplies of steel semis to be sent to the re-rollers. Much more could be done by the re-rollers to swell the volume of export trade if sufficient supplies of steel could be obtained. Competition may become severe for certain oversea markets; the Japanese have already booked large orders, chiefly for South Africa, New Zealand, and Australia.

The sheet re-rollers are inundated with orders, for which they require additional supplies of sheet bars. All arisings of defective material and crops are readily absorbed.

Non-ferrous Metals

On the whole the tin market was rather erratic last week and prices fluctuated considerably, the tendency on Friday being weaker as trading for the week came to an end. Consumers showed only moderate interest, but there is every expectation that users will come in to buy on any setback.

That is not to say that the market is expected to fall back far. With the prospect of heavy purchases of metal in Singapore by the British Government during the course of the present year, it is hard to be expected that any marked weakness can develop in London.

News is awaited of a resumption of talks between the Reconstruction Finance Corporation and the Bolivian producers with a view to arranging a long-term contract for the purchase of Bolivian concentrates, but nothing is, as yet, reported. It was noteworthy that on the London market the backwardation has pretty well disappeared.

London Metal Exchange official tin quotations were as follow:—

Cash—Thursday, £996 to £997 10s.; Friday, £992 10s. to £995; Monday, £983 to £985; Tuesday, £981 to £982.

Three Months—Thursday, £995 to £997 10s.; Friday, £992 10s. to £995; Monday, £982 10s. to £985; Tuesday, £981 to £982.

Evidence continues to accumulate of the rising tide of copper output in the world centres of production. From the United States comes news of a statement by the Anaconda Copper Company. Two projects, one in the United States and the other at Chuquicamata in Chile, will, it is estimated, lift the present level by about 95,000 tons per annum. Further additional supplies to the tune of some 30,000 tons yearly will become available at the end of 1953. In conclusion, the announcement suggests that within three to four years U.S. domestic production, together with imports of foreign metal, may well bring the amount of copper available for consumption in the United States up to 1,800,000 short tons yearly.

This is certainly a huge figure, and the prospect of supplies on such a scale should dispel any idea of a continuing copper shortage. Of late, the copper-producing companies have, understandably enough, scouted the idea that it is necessary for fabricators to consider seriously the advisability of transferring their affections to aluminium or any other commodity.

British Railways Contract for G.E.C.

A contract worth about £2.000.000, covering equipment for 52 sub-stations for British Railways (Southern Region), has been awarded to the General Electric Company, Limited.

The equipment forms part of the scheme for frequency conversion, and comprises 48 pumpless, steel tank rectifier equipments for 23 sub-stations, and switchgear for 52 sub-stations. Rectifier equipment totalling 67,500 kW. has already been supplied by the company for the Greater London area. Together with the new equipment, this will constitute the largest concentration of pumpless rectifiers on any railway system in the world. When the new contract is complete, the total installed capacity of the company's pumpless rectifiers on railways in this area will be 194,000 kW.

Power-Gas Acquisition

The United Kingdom and Commonwealth rights covering the Panindco coal-dust gasification process of Compagnie Pan-Européenne d'Installations et d'Equipement Industriels, Paris, have been acquired by the Power-Gas Corporation, Limited, Stockton-on-Tees. The process has been developed following experience of coal-dust gasification gained with the Schmalfeldt plants in Germany, and employs the principle of gasification by entrainment in preheated steam, air, and oxygen.

It is especially suited for dealing with reactive low-grade fuels and can be operated to provide various types of gas, particularly synthesis gas where a low hydrocarbon content is required. A demonstration plant has been built in France.